The Effects of Joint Operations

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Introduction

This book is a treatise about the effects that can be achieved in joint operations. Its content accords with that of official publications issued by the Alliance. At the top of the joint doctrine hierarchy of the Alliance is the Allied Joint Doctrine. It serves as a capstone for other keystone and derived doctrinal publications when it comes to the planning, execution, support and other aspects of joint operations. A quick skim of various NATO documents reveals that the way the Alliance approaches joint operations in general rests on deduction and causality. The documents promote a causal focus as they are full with references to terms such as effect, effective, efficient and the like. However, causality stands in sharp contrast with the proverbial statement that war features friction. Friction can also be found in joint operations as even the capstone publication defines it as a contributing factor to the enduring nature of a conflict. Friction frustrates action and makes the simple difficult, the difficult seemingly impossible. It may be mental or physical, externally imposed or self-induced. Friction is also found in various intra-state conflicts featuring an abundance of destabilizing groups who may wage asymmetric, irregular and low-intensity warfare against allied and coalition forces.[1]

There seems to be a contradiction between the words used and the approach chosen. According to the recent ratification draft, version (E), of the Allied Joint Doctrine the effectiveness of Allied forces depends on the ability to operate together in a coherent, effective and efficient manner in which interoperability is a crucial factor for the success of joint operations. It requires the adaptation of standards and agreements by the member states to promote long term effectiveness. At the operational level emphasis is placed on integrating the various capabilities of the contributing nations' forces. This can result in synergy that is at the heart to achieve the operational level commander's objectives. The operating environment in which forces operate features a complexity that extends well beyond the physical boundaries of land, sea, air and space of a defined joint operations area and includes actors of regional and international importance. Recently emerged factors such as cyberspace, electromagnetic spectrum and the information environment add to this complexity, too. The operational environment includes a number of interconnected elements such as political, military, economic, social, information and infrastructure. A thorough analysis of these elements and the complexity they stand for enable commanders and staffs to understand the operating environment from which it becomes possible to create effects by using all means available to them. Actions directed against these elements create effects designed to attain the end state and its constituent parts. The capstone doctrine states that key to the successful conduct of joint operations comes from the most appropriate mix of military and non-military capabilities. While each capability is limited in terms of its discrete influence and impact, careful and coordinated application of them can maximise effectiveness.[2]

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[1] NATO Standardization Office 2017

[2] Ibid.

Joint operations of the Alliance are directed at the military-strategic level, but planned and executed at the operational and tactical levels. Each level has its specific responsibilities and stands for creating desired effects that contribute to the achievement of stated objectives. Tactical successes in engagements and joint operations create desired effects on the operational level that support achieving the strategic objectives and attaining the end state. The operational level links strategic objectives to tactical military activity in a meaningful, hence causal way, which is achieved through understanding the strategic context and the outcomes sought. The ability to achieve a desired outcome depends on the will, the understanding and the capability to act in a decisive manner. Together these determine the overall effectiveness expressed in fighting power. A politically-agreed desired outcome is necessary for clarity on strategies and objectives. Creating the conditions to achieve a desired outcome requires the application of capabilities. It also requires effective collaboration between military and non-military actors, across both NATO and a broad range of multinational institutions, agencies and organizations.[3] Another core document issued by the Alliance also promotes an approach based on deduction and causality. The Allied Command Operations Comprehensive Operations Planning Directive uses terms such as end state, objectives and effects. End state is defined as a statement of conditions of an acceptable concluding situation for NATO's involvement. The end state of an operation and associated strategic military and non-military objectives are identified and defined politically. During the execution of an operation, the political strategic level determines when the end state has been achieved. The military strategic level will assist this process through the submission of periodic operations assessments on the progress of each operation, including when military objectives are considered to be achieved. Whereas an end-state is always a political statement, an objective is a clearly defined and attainable goal to be achieved by the application of military and non-military means. In the spirit of mission command objectives are assigned to a commander by the next higher level. Operational objectives are assigned to the operational commander by the strategic commander. In this sense a 'military end state' is expressed through the use of objectives. Supporting objectives may be labelled as military and/or non-military objectives to be achieved within means and capabilities available. They are intended to assist to pursue, progress and sustain the main strategic objectives. Military strategic objectives and non-military strategic objectives prescribe what should be achieved by military and non-military efforts in support of the achievement of the political strategic end state.[4]

The document clearly states that the focus of military planning is on the achievement of the military strategic objectives and their contribution to the achievement of the political end state, while considering necessary military support for the achievement of non-military strategic objectives. The military strategic level assigns operational objectives to designated operational commanders as part of their mission assigned. Initially these operational objectives are issued as 'provisional' until the operational commander has conducted his mission analysis, following which requests for amendments can be discussed with the commander on the military strategic level. During the conduct of the operation, regular operations assessments are conducted to inform on mission progress. As military objectives are considered,

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[3]   Ibid.
[4]   Supreme Headquarters Allied Powers Europe 2013

assigned commanders inform their next superior commander who again informs the political strategic level should the military supporting objective be achieved. The termination of a military operation will be decided by the political strategic level when the political end state is considered achieved or following achievement of strategic military ends, when the military is no longer needed in support of remaining strategic non-military *ends* necessary for achievement of the NATO end state.[5] Thus in this clear world of analysis and deduction an effect is a change in the state of a system or a system element that results from one or more actions, or other causes. Action is defined generically as the process of doing something to achieve an aim. An action can also be thought of as the process of engaging any instrument at an appropriate level in the engagement space in order to create specific effects in support of an objective. NATO uses effects in the planning for, and conduct of, operations at the military-strategic and operational levels. Derived from objectives, effects bridge the gap between objectives and actions by describing what changes in a system are required, including changes in the capabilities, behaviour or opinions/perceptions of actors within the operations environment and the strategic environment.[6]

Effects play a crucial role because they provide a focus for actions and contribute to the achievement of objectives and the end state. Effects must be measurable and should be limited in number. Effects can be grouped into two categories: physical and non-physical. Although all physical effects will lead to some form of non-physical effect, their primary purpose will be to influence the capabilities of actors, while non-physical effects are principally directed towards an actor's behaviour and also referred to as the cognitive domain. This change in the behavioural or physical state, which results from one or more actions, or other causes, may be further categorised. Desired are those effects that have a positive impact on the achievement of objectives. Undesired are those effects that disrupt or jeopardize the achievement of objectives. Planning attempts are important to identify and develop a plan to create desired effects, while mitigating undesired effects. The use of effects in operations planning helps in prioritizing efforts to achieve objectives and in the efficient allocation of resources. Planners should remember that determining effects properly is only possible through a sound understanding of the crisis situation, the main actors to be influenced and the cultural aspects of the environment within which an operation will be taking place.[7] Despite the awareness of friction in war and complexity in joint operations both the Allied Joint Doctrine and the Comprehensive Operations Planning Directive suggest joint operations to be approached analytically and in a deductive manner seeking causality and various sorts of effects. The concept of effects-based operations caught a remarkable attention for a good decade until realised that it was misapplied and overextended. Joint operations have a dynamic nature and feature an infinite number of variables that defy most assumptions regarding accurate prediction based on deduction and causality. The assumed and advertised benefits of the concept proved problematic and elusive. It assumed an unachievable level of predictability, could not anticipate the reactions of complex systems, called for an unattainable level of knowledge, was too prescriptive and over-engineered, discounted the human dimension, promoted centralisation and micromanagement, em-

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5   Ibid.
6   Ibid.
7   Ibid.

phasised the role of staffs, neglected that of command, could not deliver timely and clear directions, and used a confusing terminology. The concept attempted to provide certainty and predictability in a mechanistic way to inherently uncertain phenomena such as war and joint operations. The concept was judged to be fundamentally flawed with far too many interpretations that created unrealistic expectations with a huge information appetite. It became clear that unlike most promises of effects-based operations, war and within it joint operations require far more than simple tactics of targetry based on an algebraic approach.[8]

   In this book the author attempts to trace back the origins of this causality-based focus as an approach to war and joint operations. Chapter one reveals the drive for causality in military thinking that stands not only in sharp contrast with the frictional reality of war as outlined by Clausewitz, but also with the complexity joint operations stand for in a globalised world. Complex challenges require complex answers and not constructs that promote simplification based on deduction and causality. Chapter two introduces the most influential approaches to effects-based operations that promoted the concept. In the beginning most assumptions regarding effects-based operations were promising. Campaigns could be kept short, destruction and casualties limited, and precious resources be saved. The seven significant and influential publications include documents written by an American Air Force General (USAF), the Research and Development Corporation (RAND), the Institute for Defense Analysis (IDA), the United States Joint Forces Command (USJFCOM), the Command and Control Research Program (CCRP), the Air Combat Command (ACC) and the Air University College of Aerospace Doctrine, Research and Education (AU CADRE). Chapter three sheds light on the extent and pace the concept penetrated into official milestone documents such as the various Defense Reviews and the Joint Visions of that era. It also spots first reflections on effects-based operations aimed at making the concept digestible for practical purposes. The bandwith of the services' reactions was mixed at best. Reflections of U.S. Army personnel were full with references to shortcomings and weak points of the concept. U.S. Air Force interpretations were more enthusiastic and they detailed the benefits that could be gained through the application of effects-based operations.

   Chapter four examines the truth behind statements such as the concept of effects-based operations which is far from being new since astute commanders, statesmen and the like have always practiced this sort of operations. Simplified statements of this kind indicate a generalisation that de-emphasises specific social, political, cultural and economic factors that have always been important in the conduct of joint operations. All the phenomena that support war including organisations and conventions depend on a combination of certain historical circumstances. Manifestations of war are the result of societal transformations and mirror social conditions. Chapter five details military coercion based on two categories and four schools each describing one mechanism and standing for a particular effect to be achieved. As such, it serves as a background to explore the origins of effects-based operations and detect similarities with certain assumptions regarding the conduct of joint operations as stated in official NATO doctrines. Chapter six proves that the origins of effects-based operations as a joint force employment concept are rooted in the advent of powered flight. The concept can be traced back to air-power enthusiasts such as Douhet, Mitchell, members of the ACTS and Warden. It is also related to thinkers of a more general kind including

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[8]   MATTIS 2008

Slessor, Liddel Hart, Brodie, Schelling and Pape. The chapter makes clear that most theorists were passionate rather than analytical. Their theories rested on unproven assumptions advocating quick, clean, mechanical, impersonal and linear solutions to achieve victory in war. From the earliest days of powered flight, theorists have struggled to define and measure the success of joint operations in terms of effects achieved on the enemy. Most theorists assumed that precise intelligence would be available, limiting or disturbing factors could always be minimised, concentrating on ends rather than means would be a superior alternative to the traditional mechanisms of war. Controlling could substitute for destruction, and the employment of force could be reduced to targeting issues and templates. Chapter seven makes clear that most assumptions regarding causality in joint operations are in sharp contrast with the frictional nature of war as outlined by Clausewitz and elaborates on it in detail. The characteristics upon which the common elements of effects-based operations and the characteristics of joint operations in NATO doctrines are built are causality/deduction for effects focus, intangibles/control for advanced technology, and categorisation/analysis for systems thinking. However, war's frictional nature does not allow effects to be traced back to single causes as several concurrent causes are normally at work. Investigating the relationship between causes and effects becomes easy only if they are closely linked. An effect that appears correct at one level can become objectionable on a higher level and imply a new basis for judgement. The distance between causes and effects is proportionate to the number of other factors to be considered.

The book can be seen as a descriptive, reflective and explanatory study. It is descriptive since it describes the way causality decomposes in war. It is reflective since by discussing causality in war, *On War* serves as a basis. It is explanatory since problems are discovered, contributory factors are identified and explained in detail. At the heart of the book is the recognition that theories capitalising on causal constructs may run the risk of being costly, slow and unnecessarily destructive. Thus the book aims at developing a novel and coherent framework to better understand cause-and-effects relationships in joint operations.

1. Waves and Wars

An unwanted and long lasting consequence of the demise of the bipolar world order is the increasing number of non-state actors who constantly challenge the existing status quo. Unlike in the traditional international environment where states primarily interact with other states, the last two and a half decades witnessed states increasingly interacting with various non-state actors. The complexity of the international theatre provides these actors with an abundance of opportunities to become successful even over long periods of time.[9] These state/non-state interactions very often result in asymmetric confrontations, including asymmetric warfare. An examination of the outcome of asymmetric conflicts in the last two hundred years reveals a dangerous tendency: weak actors increasingly win asymmetric conflicts. The percentile outcome of strong actor/weak actor interactions that are at the heart of asymmetric conflicts dropped from 88.2 : 11.8 (1800–1849) to 79.5 : 20.5 (1850–1899) to 55.1 : 44.9 (1900–1949) and to 45 : 55 (1950–1998).[10]

The expected peace period after the demise of the bipolar world order did not last very long. NATO soldiers soon found themselves involved in many little regional wars that very much differed from their ingrained perception of what a proper war should be like. These wars were not symmetric, not regular, and not of high intensity. Not armed forces with standardized weapons, uniforms and procedures were to defeat, but various ragtag bands armed and equipped with what they could get in a globalized world. More than two decades after the end of the Cold War aberration to war proper appears to be the new norm for waging war.[11] After years of constant military involvements in operations world-wide it became clear that this breed of enemies is very difficult to defeat. They are very resilient and able to turn initial weakness into eventual strengths. The war they wage appears for regular soldiers as primitive and has very much in common with the wars of sub-state societies of the past.[12]

1.1. Instrumental Dimension

In the social wave-front theory history is regarded as a succession of waves of change. The basic assumption is that human social development has been interrupted by innovations and breakpoints generating waves moving at a certain speed. According to the theory, the first agricultural wave started a good ten thousand years ago and lasted until the industrial revolution. Although the force of this wave has basically exhausted, it still exists in the lesser developed societies around the world. The second, industrial wave revolutionised

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[9] Porkoláb 2013
[10] Arreguin-Toft 2001
[11] Mackenzie 1988
[12] Grant 2012

life in many parts of the globe within a few centuries, but had not spent its force entirely, either. This wave harvesting the benefits of fossil energy is about to be replaced by a third major wave with implications still little understood. The challenge is that waves co-exist and represent simultaneous impacts at a different rate of speed due to the forces behind them.[13] According to the social wave-front theory, the way humans generate wealth and the way they wage war are connected. It explains how wars have changed as the waves accumulated their force. Every time the waves clash, tensions between representatives of different waves accumulate and bloody wars erupt.[14]

NATO regards war as an instrument of politics and sees it as a means towards an end. It assumes that through systems thinking it is possible to detect causal relationships that can be exploited by the application of military technology. This scientific image of war resting on analysis and deduction requires the efficient application of resources. In contrast, its enemies are mostly driven by war's existential dimension and regard it as an end in itself.[15] Due to this instrumental bias, NATO is unable to understand the existential dimension and its expressive elements, and assumes wars to be short, decisive and rational. In other words, NATO is not able to see violence in a social context and ignores that cruelty and destructiveness of war express basic social conditions. War is a part of the human existence, and reflects the society with which it evolves in consonance. Throughout human history wars were mostly waged by social entities other than states, fought by social organisations other than armies with the involvement of combatants other than soldiers. Clausewitz acknowledged that nothing is eternal in war and there could be little doubt that many previous ways of fighting would reappear.[16] According to Hobbes, the essence of war is not the battle or the act of fighting, but the consumption of time that simply increases suffering and destruction. Consequently, the longer the duration, the greater the enemy has to suffer. The more he suffers the less he has to lose, and the greater his determination that the suffering is not in vain.[17] Recent military involvements of NATO in Afghanistan and Iraq showed that what matters is not the way NATO sees victory, but the way the enemy understands defeat. Military capability in traditional terms has become less and less relevant as the emphasis shifted from winning the war towards winning the peace.[18] These involvements made also clear that despite advances in social and industrial life much of the world population belongs to states without being really part of them. Hundreds of millions of people live in segments of societies that have little do with political entities.[19]

They represent earlier waves and see war from a different perspective and as a consequence, fight for different aims and by different means.[20] This explains why military involvements of NATO were confusing, distant, and squalid. Similar conflicts held off large armies during the first wave when the price to be paid seemed too high, or the gain too small for the empire builders. Western expansion and colonialism during the second wave proved

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[13] TOFFLER 1980; STADEN–ROOD–LABOHM 2003

[14] TOFFLER–TOFFLER 1993

[15] COKER 2002; HO 2003; LIOTTA 2002

[16] COKER 2002; CLAUSEWITZ 1993; HAMMES 2004; TOFFLER–TOFFLER 1993; CREVELD 1991

[17] HOBBES 1996; CREVELD 1991

[18] CLAUSEWITZ 1993; HAMMES 2004

[19] Tribes still matter 2011

[20] WEGMAN 2005; CLAUSEWITZ 1993

that primitive or imperfect warfare could not defeat modern armies supported by advanced technologies and organisation. When soldiers of the West met their enemies, the result was one-sided. Often there was no need for elaborated tactics as superiority in military capability was the decisive factor that crushed resistance with speed and efficiency.[21] The international political system of the third wave is often described as the age of complexity or post-modern. It is characterised by several parallel revolutions in information related technologies, a continuous geo-strategic restructuring, and the diminishing role of national governments. Traditional poles of attraction are breaking down, boundaries and dividing lines in the international arena are evaporating. Whereas the second wave allowed for discernible principles and boundaries, the third wave features constant fragmentation.[22] There are many actors of different types who display a wide variety of relations including both alignments and enmities. Many issues lack a dominant axis, patches on global and regional scales emerge and feature enclaves of both order and disorder. Power is distributed in a manner in which allies on one issue might be adversaries on another. This dynamic setup is extremely war-prone and contains highly anarchistic enclaves outside the traditional boundaries of the nation state. Various forms of violence flourish, which are often accompanied by the inability of governments to satisfy the requirements and expectations of their citizenry.[23] In the context of the third wave NATO must be prepared to wage asymmetric wars against enemies fuelled by a rage born from hopeless poverty, wealth discrepancies, and various religious motives. The majority of military involvements will be against enemies who prefer new and hybrid forms of war. This poses tremendous problems as they will not look, think and fight like NATO soldiers. It will be difficult to understand their motives and behaviour. Fighting such enemies not only negates advantages in military capability, but dangerously stretches available resources. Often these enemies will have to be engaged on their ground and according to their rules.[24] Failed states with collapsed institutions are in the less developed parts of the world and display characteristics of earlier waves. Armaments and tactics of these enemies blurs the traditional distinction between war and peace, combatants and non-combatants, enemy and criminal, military and civil society, war and peace, state war and civil war that all pose a significant challenge to NATO.[25]

1.2. Complex Challenges

The proliferation of technology enables non-state actors to play an increasing role in international politics. The growing number of ungoverned territories within a number of weak states easily provides for safe haven for various enemy organisations.[26] They pose a constant and considerable threat to international security and can raise the chance to have diametrically opposed civilisations. The enemies may appear as representatives of earlier waves, but their

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[21] Hammes, 2004; Wilson–Sullivan–Kempfer 2002; Wilcox–Wilson 2002; Knox–Murray 2001; Heneker 2009; War Office 1909; Ellis 1975; Biddle 2003
[22] Binnedijk 1996; Lyotard 1984; Kumar 1995
[23] Brown 2003
[24] Peters 1999a
[25] Laroque 1983; Schmitt 2004
[26] Nye 2003; Hooker 2005

intention bears serious political consequences. Their aim is to remove alien influences from their world and change the basic constellation of the international system. The character and nature of such enemies can best be described as terrorist. The term refers to the unconventional, but world-wide use of force by non-state or state-sponsored actors. Terrorists aim at destroying and killing civilian, government facilities and personnel in order to induce changes in the international system. Taking advantage of globalisation, these representatives of earlier waves try to make their impact global as they increasingly use the technological arsenal of the emerging third wave.[27]

The Global War on Terror or GWOT is an effort to fight international terrorism. It turned war into a perpetual and indeterminate phenomenon with no clear distinction between the state of peace and that of war. Waging war against such enemies indicates that war's traditional dimensions are to blur geographically and temporally. Enemies are elusive and operate outside the traditional boundaries of the nation state. They do not stand for comprehensible and localisable entities as their nature is fleeting and difficult to grasp. They are mostly unknown, unseen and yet ever present. These enemies pose a constant threat in which legitimate violence, criminality, and terrorism merge and become indistinguishable from one another. Fighting and defeating these enemies means that war is not the final element in the sequence of power, but by merging with the other elements it can become the very foundation of politics.[28] Waging such wars is both demanding and difficult. It requires the co-ordination of multiple actors, and contains a multitude of challenges and tasks. Asymmetric enemies stand for a complexity of challenges and resemble a never-ending decision tree.[29] They tend to appear in networks, which are variable, uneven and indefinite. Although they have no clear centre at all, their nodes can exchange information directly, which makes possible for them to appear anywhere and strike anytime. An enemy acting as an amorphous multiplicity or swarm can strike at any point, from any side and at any time, and disperse so as to become nearly invisible.[30] Waging war on such networks is inherently difficult, in some cases impossible, and can drag soldiers easily into vague, confusing military actions in which they have to master messy situations and pull everything together.[31] The conduct of asymmetric warfare is not only confusing, but also paradoxical. It contains fragments of older forms including modern, ancient, and even ritual war in which even conventional weapons can have unconventional effects.[32] NATO's dependence on technology means that even actions on lower levels may need political preparation and justification. Asymmetric warfare is inherently political in which victory for the weaker often means hurting, rather than defeating a superior enemy.[33] Asymmetric wars of the 20th century showed that wars can be lost militarily, but won politically. In a globalised world, traditional factors such as gross national product, research and development capabilities, organisational and management skills are becoming less and less the decisive factors for victory in war.[34] It appears that technologies may come and go, but the primitive endures. Most enemies

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[27] Dorff 1996; Barber 1992; Wijk 2005; Kaplan 1995; Kibble 2002
[28] *Address* 2001; Hardt–Negri 2004
[29] Byman–Lesser–Pirnie–Benard–Waxman 2000
[30] Ibid; Edwards 2000; Edwards 2004
[31] Zinni 2000
[32] Wheatley–Kellner-Rogers 1999
[33] Hanson 2005
[34] Huntington 1993; Handel 1986; Tomes 2004

NATO soldiers face resemble a basic human archetype. They thrive on disorder and any confrontation with order makes them shrivel. These enemies have no stake in peace and see no advantage in the status quo.[35]

For much of the world's population, participating in wars is a step up rather than a step down. They fight for shadowy and loose organisations requiring a tribal-like identity, rather than any form of citizenship. Asymmetric wars must be waged against enemies who are less disciplined, more spontaneous and resemble attributes of criminal gangs. This mix makes it extraordinarily hard to achieve any sort of decisive victory over them. These enemies operate on a global scale. They are as brutal as ever, but much better-armed. They prefer to fight without written and customary rules. War provides them with leisure, wealth, recognition and camaraderie. They wage wars for their own sake, interwoven with various moral and religious ideas. Consequently, waging war against them is flexible, mobile and filled with tacit elements. Decreasing temporal and spatial limitations indicate that such wars can become virtual from a technological point of view, and bodiless from a military point of view.[36] The most striking paradox of the third wave is that unlike earlier waves, the outdated, the poor and the obsolete has the potential to defeat Western soldiers who have all the means advanced technology can offer. The third wave seems to end an era of traditional wars in which the actual use of military force was the central element of statecraft. Recent military involvements of the West made clear that traditional military instruments of national power and their non-traditional use are equally important.[37]

1.3. Causal Responses

The way ahead still appears to be vague as NATO faces a bewildering array of threats. Combating asymmetric enemies poses a serious challenge, which cannot be approached in traditional terms based on sustained focus and predictable scenarios. Attempts to address this complexity of tasks resulted in many concepts. Names such as revolution in military affairs, shock and awe, fourth/fifth generation warfare, network-centric warfare, rapid decisive operations, and effects-based operations sound familiar for many. These concepts do differ in name and content, but can be characterised by three interrelated elements such as causal-focus, technology-orientation and systems-thinking.[38] They represent mental models based on deduction, analysis and causality. They are normative in a way that they give the impression that wars can be won cheaply without involving much destruction. They focus on the operational level of war and advocate various ways of looking at operations in a wider context.[39] They promote jointness as they do not rely solely on technology, precision strike, air power or any other service bound military capability. These concepts advocate a broad view that transcends service boundaries and offers a coherent framework for various force employment activities.[40] They accord with the wide-spread assumption that modern warfare

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[35] CHISHOLM 2003–04; PETERS 1999a; FLAVIUS 1959
[36] EHRENREICH 1997; KAPLAN 1994; PARET–CRAIG–GILBERT 1986; PETERS 1994; PETERS 1995–96; GRAY 2001
[37] TUCKER 2001
[38] SKINNER 2006
[39] HUVAL 2005
[40] MANN–ENDERSBY–SEARLE 2001; WILLIAMS 2002

has become so debated in the more economically developed societies that large, bloody campaigns are regarded as a thing of the past, and not tolerated by the majority of the politicians and the population. Their inherent focus on causality indicates that it is possible to take advantage of direct cause-and-effects relationships in war. Thinking in terms of effects rests on the assumption that it is possible to directly translate strategic objectives into tactical actions. No doubt, simple causal mental constructs are always helpful in guiding the decision-making process. However, as soon as wars start, plans evolve very rapidly and may become fluid. Military activities have a dynamic nature and are shaped by changing tactical actions, which defy most assumptions regarding direct causality.[41]

Direct causal relationships need a certain continuity or stability in terms of objectives. However, Clausewitz warned that during war the original political objects can greatly alter and may finally change entirely due to various unforeseen events and their consequences.[42] Deductive thinking can be helpful and iterative cycles might help optimise for achieving effects. In case the enemy is a nation state and depends on a well-developed, modern and vulnerable infrastructure, the search for direct causality aimed at certain leverage points might make sense. When confronting asymmetric enemies that do not possess such attributes, relying on an exclusively deductive strategy as a basis for actions is both time-consuming and does not address the dynamic and fluid character of war.[43] Technology-orientation advocates military capability and emphasizes the role technology plays in war. The danger is that it can rest on unproven and optimistic assumptions about what technology can deliver in war.[44] Although technology advances and opens unprecedented opportunities, it is not yet clear whether it changes war's nature or just its form. Advanced computers, sensors and other data processing tools always coexist with subjective filters as decisions come mostly as a result of individual judgements.[45] Operations aimed at controlling the enemy's will and behaviour might be politically correct and sound palatable. Nevertheless, killing the enemy is sometimes more effective than any careful attempt to influence his mind. Under certain circumstances it is simply not possible to realise psychological end-goals based on influence and control. As the second war in Chechnya displayed, should the enemy have a deep and persistent antipathy, it will be impossible to achieve victory without a decisive confrontation and military conquest.[46] Systems-thinking features both a mechanical system-of-system understanding that decomposes the enemy into ever finer details, and the more organic complex adaptive system approach with a holistic focus. There is a difference between thinking in terms of passive complicated systems, or complex systems that have the ability to learn and adapt. Whereas the first allows for a deductive methodology assuming clear boundaries, the latter emphasises unclear and shifting boundaries that require both deduction and induction.[47] According to the mechanistic approach control is possible. The organic approach in which the enemy is seen as a complex adaptive system is less ambitious and allows only for coping. Most concepts call for the simultaneous application

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[41] Cordesman–Burke 2003
[42] Clausewitz 1993; Polumbo 2000
[43] Barlow 1992; Lee 1999
[44] O'Hanlon 2000; Hammes 2004; Tenner 1996
[45] Echevarria 1995–96; Kiel–Elliott 1996
[46] Burridge 2004; Thomas 1999
[47] Smith 2006

of all means intended for a given action. They assume symmetry as the enemy's elements of power are addressed. Virtual and non-state enemy organisations without traditional elements of power deny the usability of analytic categories in traditional terms. This problem is often magnified by the fact that the complexity of challenges, even within a single mission, can limit the range of applicable means. Thus armed forces are often constrained and have to adjust to as a part of a larger operation.[48]

Causal focus, technology orientation and systems thinking appear to be in sharp contrast with most attributes of war. Thus there is a contradiction between the common elements of the concepts and war's uncertain nature. War's constant and universal qualities, including violence and chance, point towards uncertainty and ambiguity.[49] Terrorist organisations herald a new type of asymmetric enemy capable of confronting the West on a global scale. By being dispersed and avoiding decisive engagements, terrorists continually take advantage of the globalised world.[50] Whereas the West relies on overwhelming force based on technological sophistication, terrorist organisations use intellectual capital and successfully discover vulnerable niches. The most important consequence of asymmetry is that there is an increasing disparity between the traditional vision of a kinetic kill and the remaining effects to be achieved.[51] The three interrelated elements of the concepts suggest that war can be waged in a clinically clean manner by focusing on ends as carefully selected effects that can be linked to causes in a systemic manner and realised through the application of advanced technology. Now the question is that can the proverbial frictional mechanism of war as outlined by Clausewitz be solved through a causal-focus, technology orientation, and systems thinking?[52]

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[48] CLAUSEWITZ 1993; ALBERTS 2003
[49] BAYLIS–SMITH–OWENS 2007; KOLENDA 2002
[50] PENDALL 2004
[51] READ 2005; TOFFLER–TOFFLER 1993; DUNLAP 1997; CHISHOLM 2003–04
[52] CLAUSEWITZ 1993

2. Wars and Operations

The interrelated elements of causal-focus, technology-orientation and systems-thinking come best to the fore in the concept of *effects-based operations.* The term appeared during the 1991 war against Iraq in which the American-led coalition forces achieved a victory that surprised even the most optimistic analysts. The world, expecting a rather bloody and protracted campaign against Saddam Hussein's armed forces, witnessed a war fought at lightning speed with limited coalition casualties. The potential of advanced technologies in the form of stealthy platforms and precision weaponry was in the global media. Effects-based operations emphasised the primer of achieving effects on the enemy and disregarded large-scale destruction. Soon the term *effects-based* penetrated into the military lexicon and became synonymous with NATO, especially American, technological superiority. Over the years various derivatives were born such as effects-based thinking, effects-based targeting, effects-based approach, effects-based planning, effects-based execution and effects-based assessment.[53]

Most assumptions regarding effects-based operations were promising. Campaigns could be kept short, destruction and casualties limited, and precious resources be saved. Despite the popularity of the concept there was neither a common understanding of the meaning of effects-based operations, nor a widely accepted definition of the term. In order to handle this shortcoming, the author introduces seven significant and influential publications. Every publication, regardless its logical and theoretical merit, is assigned equal weight.[54] The documents include papers written by an American Air Force general (USAF), the Research and Development Corporation (RAND), the Institute for Defense Analysis (IDA), the United States Joint Forces Command (USJFCOM), the Command and Control Research Program (CCRP), the Air Combat Command (ACC) and the Air University College of Aerospace Doctrine, Research and Education (AU CADRE).

2.1. Technological Superiority

General Deptula from USAF can be seen as the earliest promoter of effects-based operations. According to him the successful air campaign of the 1991 Gulf War was the birthplace of the concept. However, it is not original since excellent military commanders have always known superior alternatives to attrition. The concept is a methodology, a different way of thinking that capitalises on the causal relationship between action and outcome.[55] Technological superiority in the form of stealth technology and precision guided munitions make it possible to attack

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[53] Allied Command Transformation 2004
[54] Ministry of Defence 1999; Ho 2003
[55] DEPTULA 1995; HENNINGSEN 2002; DEPTULA 2003

more separate targets at once than ever before. For Deptula it is not the sheer number of sorties that is important, but the way operations are planned. Instead of focusing on simple and utter destruction of targets, the intention is to achieve specific effects on the enemy. At the core of the concept are simultaneous attacks on high value objects that result in surprise, influence, fewer casualties, paralysis, and controlling the enemy in a shorter time span. Consequently, it becomes possible to fully exploit the temporal and spatial dimensions at every level of war.[56]

Not destruction, Deptula asserts, but control across the breadth and depth of the entire theatre is important, which eradicates the enemy's strategic freedom. Control makes possible to attain security objectives without destruction or visible disruption. The enemy must be understood as a system-of-systems in which essentials such as leadership, population, industries, transportation, and military forces are affected in order to achieve system ineffectiveness.[57] This requires a high rate of attack that deprives the enemy the ability to adapt or find alternatives. Central to this is precise weapons delivery, the relative low number of resources needed to suppress enemy air defences, and an operational level force employment concept that focuses on effects. Stealth and precision contribute to the ability to achieve control over parts of the enemy's systems, which leads to paralysis during a specific period. The result is harmony between the efficiency of hitting individual targets and the effectiveness to achieve campaign objectives. This enormous leverage makes the traditional concept of war, focusing on destruction and exhaustion, useless. A paralysed enemy equals a destroyed enemy. The concept stands for a deductive top-down approach in which strategy is decomposed into specific objectives down to specific tasks at the tactical level. This way it becomes possible to directly relate lowest-level tasks to highest-level objectives.[58] Planning for effects is complex and planners must carefully determine which effect on what system can best contribute to the stated political and military objectives. Although parallel attacks are aimed at all targets in each target system simultaneously, campaigns may involve more than one set of force application. No intelligence delivers perfect information on the enemy, especially when it comes to intentions and attempts. Although effects-based operations reduce the time requirement relative to previous wars, the maturation of certain effects might take a finite, but indeterminate time. Thinking in systemic effects is superior to individual target destruction as it shifts the focus from annexing territory towards controlling deviant behaviour. The concept is coercive and requires the co-ordinated application of all elements of national power in order to force enemy compliance. Applied properly, it becomes possible to expand the strategic options, avoid attrition-oriented encounters, and to achieve integrated, specific operational and strategic effects.[59]

General Deptula did not deliver a definition of effects-based operations or a taxonomy that helps categorise effects. Jay M. Kreighbaum, a former student of the Air University built on his ideas and developed a detailed taxonomy based on the order of effects, their dimension of time, their intention and the way they relate to the levels of war.[60] According to him almost all effects start as material ones and produce non-material, second-order effects, thus

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[56] DEPTULA 2001
[57] DEPTULA 2003; DEPTULA 2001b
[58] DEPTULA 1995; DEPTULA 2003
[59] DEPTULA 1995
[60] KREIGHBAUM 1998

implying a continuum characterised by physical and psychological effects as end-poles. The physical effect refers to those first-order, direct effects that result immediately after an action and equal physical destruction. These effects possess a strong physical component and are associated with affecting the enemy's war-making capability. Second-order, indirect effects are downstream results of first-order effects and have some sort of systemic or psychological influence that can either be within a system or between systems. Systemic effects can also be seen as functional effects that disrupt a specific system or systems. Psychological effects attempt to affect the will of the enemy and require mostly an indirect approach. Regarding the temporal qualities of effects, they vary in time as their influence depends on the duration needed to mature. Whereas direct physical effects at the tactical level have a short life-span, effects desired on the strategic level need more time to mature, and have a longer life-span. Despite the planned intent, actions can result both in intended and unintended effects, which can either be adverse, neutral or supportive to the original intent.[61] In terms of properties there are strategic, operational and tactical level effects. Strategic effects influence the war as a whole by affecting major functional areas such as war-will and war-sustainment. They require considerable time to mature and have a long duration. Operational effects refer to campaigns and major operations. They influence functional areas such as war sustainment and war making. These effects are intermediate in terms of maturation, influence and duration. Tactical effects deal with individual battles and engagements. They influence the war-making capability since their generation, maturation and influence are rather short.[62]

2.2. Analytic Challenge

Paul K. Davis from RAND emphasised that effects-based operations are not new, as successful commanders of the past have also striven for objectives and related effects. The origins of the concept for him were rooted in the revolt of the war-fighting community against two interrelated failures.[63] The first was the poor force employment strategies of past wars, which focused on servicing targets. The war against Iraq was a major war in which joint fires resulted in decisive effectiveness on enemy systems. Thus origins of the concept can be found as much in the work of air power theorists as in the modern U.S. manoeuvre theory of the 1980s. The second failure came for him from poor standard models and analytical tools, which focused on simple number crunching and did not accord with the battlefield reality. As inappropriately structured conceptions they rested on an inadequate mechanistic view of warfare, and ignored important soft factors such as will and cohesion.[64] Effects-based operations require a much broader approach and a more realistic analytical toolset. The concept does not focus ultimately on traditional considerations since it emphasises aspects such as collapsing the will and unit cohesion, and defeating enemy strategy. Enablers are speed, agility, parallel warfare, decisiveness, and shock and awe. Despite the promises of the concept, war also stands for attrition, destruction and occupation, all indicating that traditional aspects of war fighting cannot be excluded entirely. Although the valid essence of effects-based

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[61] Ibid.
[62] Ibid.
[63] DAVIS 2001
[64] Ibid.

operations is the systemic view and the focus on desired effects, a certain amount of attrition and annihilation, and the occupation of territory cannot be ruled out entirely. Some of the most decisive joint operations might still be personal and up-close experiences. The concept stands for the physical and behavioural aspects of war with further distinctions based on networking, the character of the target system, timescale and the levels of the conflict.[65]

Whereas physical aspects include the disruption of enemy manoeuvre, damaging enemy assets and killing enemy personnel, behavioural aspects aim at demoralising fighting capability, slowing down enemy actions, confusing and deceiving enemy commanders and influencing the decision-making process. The high-goals of the concept aim at the cognitive domain, the decision-making process of political and military key personnel, or an entire population. Davis calls for a strong recalibration in terms of common sense as it has always been difficult to understand and model enemy leaders on the strategic level. In most cases there are no vulnerable elements at the operational level that can be attacked successfully. Human activities occur in complex adaptive systems, which often behave in unpredictable ways. The enemy has attributes that are observable only indirectly and after a certain time delay. Causal relationships are influenced by numerous internal and external factors for which there is never a single discernible variable on hand. His definition of the concept emphasises the importance of probability as effects-based operations are "conceived and planned in a systems framework that considers the full range of direct, indirect, and cascading effects, which may – with different degrees of probability – be achieved by the application of military, diplomatic, psychological and economic instruments."[66] Consequently, the concept requires changes in the current mindset concerning war. New theories and methods are needed, together with a new empirical base in order to improve existing analysis and modelling tools.[67] In terms of taxonomy Davis did not deliver a definition for an effect, but gave a simple taxonomy that describes them in a hierarchical order. Thus effects can either be physical or behavioural in nature. Further distinctions can rest on duration, level, and type. In terms of duration, effects can be permanent or temporary as they can last for the course of a war, an operation, or a task. Their level mirrors the traditional hierarchy of war as effects can occur on strategic, operational, tactical, and engagement levels. The type of effect can be direct physical, systemic and psychological-behavioural.[68]

2.3. Decision Superiority

For Gleeson et al. from IDA, the concept stands for producing desired futures with a focus on the entire continuum of war and not just the conflict itself.[69] This makes it possible to exploit the overwhelming amount of data provided by advanced information, surveillance and reconnaissance technology. It means winning both war and peace in which the emphasis is on higher order effects and complex adaptive systems. Effects-based operations make it possible to focus on operations more coherently. The exploitation of new technologies and

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[65] Ibid.
[66] Ibid. 26.
[67] Ibid.
[68] Ibid.
[69] GLEESON et al. 2001

capabilities such as stealth, precision munitions and information operations are at the heart of the concept.[70] Waging war successfully demands assessment and adaptation at every level of warfare, and the involvement of all elements of national power. This way it becomes possible to see the big picture and explicitly and comprehensively link actions with outcomes at all levels. Although fog and friction of war can never be eliminated, the concept makes it possible to learn how to work with uncertainty, ambiguity and risk. Effects-based operations require a clear linkage between strategic outcomes, desired effects and tactical actions, in which military actions must be consistent with, and complementary to stated political, diplomatic and economic goals. A successful co-operation and co-ordination across all elements of national power direct the focus from the traditional attrition-oriented warfare, and enable a more efficient and focused employment of force. Effects-based operations rest on rich interactions between operational level commanders and other key actors. Centres of knowledge can enable an understanding of the strategic and operational environment, the possible effects and their impact, and suggest ways to assess and reassess the enemy. Effects-based operations stand for a continuous process similar to the classical observe orient–decide–act loop as outlined by Boyd, but the concept's strategic focus makes the loop broader and deeper. It is a mixture of precision engagement, dominant manoeuvre, and information operations in which all elements of friendly national power address all elements of the enemy's national power.[71]

Although the concept is extraordinarily difficult and requires hard thinking, capable commanders throughout history have always tried to implement effects-based operations. Success depends on understanding what the enemy values together with his beliefs and cultural motives. The concept does not help to lift the fog of war, but exploits information advantages throughout the war. An important requirement is to shed the practices of mirror imaging and the projection of own culture, values and perspectives onto the enemy who always acts in unexpected ways. This also means that military forces will probably be tasked in a supporting role to other agencies and will be only one element. The concept requires the ability to alter and adapt assumptions and rules when confronted with a complex and adaptive enemy on the battlefield. The application of the concept will not yield peace, allow conflicts without any drop of blood, or guarantee that wars will be won quickly and easily. It can offer campaigns with greater coherence in which victory is achieved faster and cheaper in terms of money and men.[72] For taxonomy, Gleeson et al. do not deliver a definition of effects, but identify and examine three major categories such as desired, undesired and unexpected.[73] Desired effects address either enemy capabilities or decisions in order to change actions, but not will. Desired effects on enemy capabilities depend on the actions taken to change the situation and options in a way that they become unfavourable for the enemy. Desired effects on decisions depend on the enemy's reaction and attempt to change his assessment of the situation and the resulting options. Undesired effects are easier to recognize than to predict, and can lead to difficult and costly conflict termination. For undesired effects, time plays an important role and may potentially support or hinder a lasting peace. Unexpected effects are the result of the fog and friction of war. These effects do not always

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[70] Ibid.

[71] Ibid; OSINGA 2005

[72] GLEESON et al. 2001

[73] Ibid.

represent problems, but can contribute to new and exploitable opportunities.[74] The most important aspect of the taxonomy concerns the relationship between effects and time. The assessment and importance of effects can change over time as new trends emerge and various indirect effects occur. Actions that result in planned and desired effects at a particular time can result in different effects later. Whereas some effects can work well together and create synergy, others interfere and negate each other's impact. Planning for effects should be guided by the effort to synchronise the timing of effects with actions. This makes it possible to put pressure on the enemy's decision-making process to make his decisions and actions irrelevant.[75]

2.4. Entire Spectrum

Members of the USJFCOM J9, Concepts Department regarded the concept as one with far reaching consequences for the conduct of war.[76] Effects-based operations cover the entire spectrum of operations including all levels of war, and require the application of all instruments of national power involving political-military relationships, and various inter-agency activities. The concept provides a comprehensive insight into enemy capabilities, environment characteristics, and own strengths and weaknesses.[77] For them effects-based operations stood for a process for obtaining a desired strategic outcome called effect on the enemy through the synergistic and cumulative application of the full range of military and non-military capabilities at all levels.[78] The concept facilitates desired effects through all available capabilities, includes assessment of outcomes and requires rapid adaptation through continuous and iterative planning and execution cycles. Comprehensive knowledge comes from networked and interrelated expert teams that conduct a systems analysis of the enemy. Desired effects are stated in the commander's intent, which focuses on the cohesion and behaviour of the enemy by causally linking tactical actions to desired strategic objectives. Effects-based operations mean that the full range of capabilities is applied in order to threaten, render useless or destroy things the enemy values most. Technological innovations and analysis tools make it possible to exploit causal linkages between effects and objectives.[79]

Effects can be seen as the results of actions that support objectives through causal linkages. The concept does not only provide the institutionalised process of planning and assessment, but acknowledges that a single action can produce more than one effect. Thus it requires flexibility to consider all potential consequences of the actions taken. They also recognised the difference between an effect and an objective. Whereas an objective includes only the desired results, an effect can both be undesired and unexpected. Effects are hierarchical in nature and can be characterised by focus, scope, scale, timing and visibility. Although effects can work well together or interfere, they aim at degrading the enemy's

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[74] Ibid.

[75] Ibid.

[76] USJFCOM J9 2001a

[77] Ibid.

[78] USJFCOM J9 2001b

[79] USJFCOM J9 2001a

decision-making process. Effects-based operations rest on a cohesive picture that includes information on political, military, economic, social, information and infrastructure factors. The concept requires the study of the enemy as a complex adaptive system with the aim to identify key links and nodes to get a better grip on his war-making and war-fighting ability. This system-of-systems analysis determines the courses of action in order to bring the enemy's behaviour towards the desired end state. Consequently, the focus is on pressure points to constrain and canalise enemy actions.[80] The historical focus in joint operations was on direct, first-order effects. The concept stands for the refocus towards follow-on effects and other potential consequences. It relates all tactical actions to the overall desired outcome in which effects are traceable back to higher order strategy. It requires the assessment of actions in order to determine to what extent desired effects have been achieved.[81] Understanding of the full spectrum of capabilities the instruments of national power offer is of utmost importance as this way it becomes possible to modify enemy behaviour. It is important to target the will and perception of the enemy together with the capability of his military forces.[82] As to taxonomy, an effect stands for the physical, functional, or psychological outcome, event, or consequence, which results from specific military or non-military actions.[83]

Effects can also be characterised in terms of duration, speed and synchronicity. The most important attribute of effects is their hierarchical or nested relationship, which means that they can be either top-level/supporting or cumulative/cascading. The cumulative attribute indicates that not the sum of the effects achieved is important, but rather the synergy gained through them as it is more applicable to the higher levels of war. Cascading stands for the way higher order effects move downward through common and critical nodes of the enemy's system. Effects can work well together if they complement, or amplify each other, or they may interfere, dampen and even cancel out each other's impact. Although effects can be anticipated, the ability to anticipate all effects is beyond human capability.[84] There is a difference between desired, direct and indirect effects. A desired effect can either be physical damage to material or a casualty effect inflicted on personnel. Whereas a damage effect can be light, moderate or severe, a casualty effect can be immediate, prompt or delayed. Direct effects are the immediate, first order consequences of military and non-military actions that can be recognised easily, as there is no intervening event or mechanism between the act and the outcome. Indirect effects may be physical and psychological in nature, but are always delayed, follow-on consequences of actions, and difficult to recognise.[85]

2.5. Information Advantage

Edward A. Smith from CCRP examines the relationship between effects-based operations and network-centric warfare.[86] The latter indicates joint operations conducted in a previ-

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[80] Ibid.
[81] Ibid.
[82] Ibid.
[83] Ibid.
[84] Ibid.
[85] Ibid.
[86] SMITH 2002

ously unreachable region of the information domain. For him this stands for a new type of information advantage characterized by significantly improved capabilities for sharing and accessing information that dramatically increases combat power on the tactical and operational levels of war. In an abstract sense network-centric warfare focuses on achieving effects on the enemy. Through the combination of both concepts, war-fighting effects can be achieved at a higher operational tempo, which locks-out adversary courses of action. However, this is not entirely new since good generals, admirals and statesmen have successfully applied military force to shape the behaviour of both friends and foes.[87] The concept stands for the ability to alter the enemy's thinking and behaviour through political, economic and military actions that coerce the enemy to take a certain course of action. It is possible to see joint operations as a cohesive political, economic and military effort. Unlike attrition-oriented campaigns that aim at degrading the physical capability of the enemy, effects-based operations aim at achieving psychological effects in the cognitive domain. The goal is to influence the enemy's behaviour to the extent that he does not want to continue with his resistance. Although achieving physical effects will remain a factor even in effects-based operations, the true focus is on achieving psychological effects in which destruction is not the central factor or is to be avoided. The concept stands for coordinated sets of actions directed at shaping the behaviour of friends, neutrals, and foes in peace, crisis, and war.[88] Interactions between stimulus and response motivate the enemy towards a particular behaviour. The easiest way to do this is to destroy certain capabilities through physical actions. Success rests on a superior knowledge of the enemy and the situation in order to influence the decision-making process. The aim is to disrupt his observe–orient–decide–act loop, which limits the ability to take coherent actions.[89] Destruction is only important in terms of its impact on the enemy's will and psychology, but not on his physical capabilities. Effects-based operations together with network-centric warfare make possible to create a condition in which the enemy re-observes, re-orients and re-decides continually with the result that he cannot act coherently or cannot act at all. The concept places a premium on achieving effects on the enemy's decision-making process for which Smith suggests three approaches. The first multiplies the number of opportunities that lead to desired effects since the employment of frequent stimuli increases the chance that these effects will occur at the right time. This requires shortening the time needed for decision-making in order to multiply the impact on the enemy. The second exploits self-synchronisation and shared situation-awareness by launching more numerous, but smaller operations in order to affect the enemy's decision-making cycle. The third rests on the multiplication of cycles and the compression of time needed for execution. The last two options are analogous with the attack of a bee swarm. Due to the amount of such stimuli, the enemy can no longer act coherently and is driven into shock and chaos.[90]

The ability to create situations in which a relatively small application of force results in disproportionate and decisive impacts on the enemy is central to the concept. Operating beyond the enemy's edge of chaos may cause a state of despair in which further resist-

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[87] Gartska 2000; Smith 2002
[88] Smith 2002
[89] Ibid.
[90] Ibid.

ance appears to be futile.[91] The concept helps turn war into an asymmetric contest in which the forces involved are dissimilar in character and the respective courses of action are different. Consequently, there may be two edges of chaos that cross each other and produce a second asymmetric zone. This zone can reverse the advantage achieved in the first or common zone of the contest as the enemy is able to define a niche within which he successfully competes. A network-centric force employed in effects-based operations can act as a complex adaptive system with the ability to mass superior effects on the will of the enemy. The result is not only an improvement in combat efficiency, but also an increase in effects-based efficiency.[92] For taxonomy Smith acknowledges that the term effect has a destructive meaning, and often implies nearly everything in military research. A more general operational connotation might be helpful in delivering a definition in which an effect can be described as a result or impact created by the application of military and other power.[93] This includes kinetic and non-kinetic effects, and is equally applicable to physical and psychological/cognitive effects. Effects can also come from military power without the involvement of destruction or the application of other power sources. Effects are cumulative in nature since they interrelate and never appear in a vacuum. Consequently, the ultimate effect is a cumulative overall outcome that rests on various cycles of interactions.[94]

Effects are mainly produced by physical actions and fall into two general areas characterised by predominantly physical or psychological attributes. Both sorts of effects alter behaviour in the end, but whereas physical effects work through the application of physical means, psychological effects work by affecting the enemy's cognitive process. Physical effects include destruction, physical attrition and chaos/entropy that incapacitate enemy forces and capabilities. Psychological effects are chaos/entropy, active and passive foreclosure, shock and psychological attrition aimed at the domains of reason and belief. Direct physical effects can provoke a chain of subsequent, indirect events that may eventually change the enemy's behaviour. The initial impact of physical effects can grow and cascade through the enemy, and eventually spread into the psychological dimension. Physical effects can also initiate higher order physical and psychological effects, which again can cascade into even higher order psychological effects.[95]

2.6. Direct Translation

According to members of ACC the concept is not really new, since it has always been applied throughout history with various degrees of success.[96] However, even today it is only sporadically discussed in military doctrines and there is no methodology available for a systematic application. Consequently, it is not yet clear how effects and mechanisms relate to objectives and strategy. Effects-based operations stand for actions taken against enemy systems designed to achieve specific effects that contribute directly to military and political

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[91] Ibid.
[92] Ibid.
[93] Ibid.
[94] Ibid.
[95] Ibid.
[96] Air Combat Command 2002a

objectives.[97] The concept takes objectives-based planning and the strategy-to-task approach further. Although effects-based operations examine the conditions and causal linkages between actions and objectives, it is not the action itself that is important, but the causal linkages that determine whether or not a desired effect is achieved. The focus of the concept is on follow-on effects, and not on the probability of achieving the desired result as no action creates only one outcome.[98] Target destruction is still important, but only to the extent the destruction contributes to the achievement of various functional, systemic and psychological effects. An effects-based methodology might also mitigate negative collateral outcomes and other unwanted consequences. Although the fog and friction of war cannot be eliminated, a thorough examination of the causal linkages can improve the probability of success. Thus the concept stands for a much broader approach than sheer military application as the requirement is to link all elements of national power explicitly and comprehensively across the full spectrum of activities. Victory in war comes from the harmony between the effects desired, the consequences of actions, and the means necessary for an assessment of the effects in question. The concept stands less for a conquest based on attrition and annihilation, but more for controlling the enemy's operational level systems and capabilities to limit his options at each level of war. This way it becomes possible to better integrate all elements of national power and exploit the advantage provided by modern technology. The result is less costly in resources and transformation, which extends far beyond joint operations. Although compliance through brute force remains an option to effects-based operations, operations of the 21st century should attempt to influence decisions and change behaviour with measures being systemic and psychological, rather than physical.[99] Complex interactions with the enemy and rapidly changing conditions require a continuous adaptation enabled by an interagency and multidisciplinary approach. A methodology to successfully apply effects-based operations can come from existing joint publications. The emphasis is on tightness in terms of planning, execution, and analysis that flows down from the national strategic to the tactical level. Enemies represent adaptive human organisations in which the challenge is to out-think and out-adapt them. Effects-based operations replace the simple application of military force with the application of all elements of national power in an integrated and focused manner.[100] Although members of ACC did not provide a detailed taxonomy of effects, their glossary contains a thorough terminology.[101] Thus effects include the full range of outcomes, events or consequences that result from a specific action. For them it is possible to differentiate between intended and unintended effects, and between direct and first-order, and indirect and higher-order effects. Effects can also be cascading, collateral and cumulative depending on the way they penetrate through the enemy's system. Regarding their nature, effects can be physical, functional, systemic and psychological as they appear on the operational and strategic levels of war.[102]

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[97] Ibid.

[98] Ibid.

[99] Ibid.

[100] Ibid.

[101] Air Combat Command 2002b

[102] Ibid.

2.7. Success Paradigm

According to Mann et al. from AU CADRE the concept neither focuses on conquest nor represents the displacement of current forms of warfare.[103] The concept can be seen as a refinement of the objectives-based methodology and the strategy-to-task approach. It allows planners to better examine conditions in terms of causality to define the relationship between actions and objectives. Through the application of all elements of national power across the full spectrum of a conflict, effects-based operations explicitly and comprehensively link strategic and operational objectives with tactical actions in a continuous and iterative fashion. The focus is on desired effects that help achieve assigned objectives, which indicates a refocus from destruction.[104] Effects-based operations span across the full spectrum of political, military and humanitarian engagements. As a systematic approach, the concept focuses on outputs instead of inputs. The emphasis is on national goals, and not capabilities or prerequisites of individual services and organisations.[105] The concept stands for a new paradigm, according to which military actions are an extension of politics and diplomacy. The U.S. Air Force has always attempted to do effects-based operations, but only piecemeal without recording or codifying the lessons learned through its experiences. The destruction of targets is just means to achieve ends since physical destruction is only one desired effect within a wide spectrum. The focus is on the output through the application of both lethal and non-lethal means at the tactical level, which result in pre-determined direct and indirect effects at the operational and strategic levels. Due to their dual nature effects ripple and cascade through the enemy system as effects of any given actions may induce further changes. Virtually no part of the enemy system is truly isolated and the cumulative and cascading character of effects means that it becomes increasingly difficult to predict and measure higher-order effects.[106]

Attrition and annihilation are just specific types of outcomes, which may be useful only in some cases as the real goal is to achieve high-level psychological effects. Effects-based operations rest on actions taken against enemy systems designed to achieve specific effects that contribute directly to desired military and political outcomes.[107] They point towards the importance of conditions and causal linkages through which actions lead to stated objectives. Effects-based operations always mean further asking and accepting unexpected effects in which the emphasis is on the ability to deal with complex interactions, adaptation to changing conditions, and turning initial shortcomings into an advantage. Unfortunately, despite deep roots and the power of effects-based operations, the military has never really attempted to institutionalize a thought process that is needed to ensure adherence to effects-based principles.[108] In terms of taxonomy, effects are inherently complex phenomena and demand an exhaustive and comprehensive categorisation. Effects have a dual nature and can be both causes and results. Effects refer to a full range of outcomes, events or consequences that result from a specific action, and can be categorized either as direct or indirect. Direct

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[103] MANN–ENDERSBY–SEARLE 2002; MANN–ENDERSBY–SEARLE 2001
[104] MANN–ENDERSBY–SEARLE 2002; MANN–ENDERSBY–SEARLE 2001
[105] Ibid.
[106] MANN–ENDERSBY–SEARLE 2002
[107] MANN–ENDERSBY–SEARLE 2001
[108] MANN–ENDERSBY–SEARLE 2002; MANN–ENDERSBY–SEARLE 2001

effects are those with no intervening effect or mechanism between action and outcome. Such effects are usually immediate and easy to recognise. Indirect effects are triggered by direct effects and have an intermediate consequence or mechanism in between as such effects are often the cumulative and cascading results of many direct effects. They are generally more difficult to recognise due to the time required for maturation. Both direct and indirect effects can be physical, functional and psychological in nature, although indirect effects may also be systemic. A further distinction rests on the order of effects, and differentiates among first, second and third-order effects. Whereas first order-effects are directly attributable to a certain action both in terms of location and time, second- and third-order effects are only indirectly attributable to their causes.[109]

Effects can also be cumulative or cascading. Cumulative effects are the aggregate results of many direct and indirect effects, and refer to how effects flow upward in the hierarchy. Cascading effects refer to how results at higher levels can flow down and influence lower levels of employment. Effects have a distributive character as they ripple through the enemy's system. Each successive layer of effects makes any precise prediction and measure increasingly difficult. Higher-order effects tend to be fleeting in character and give room to subjective interpretations. Collateral effects are unintended occurrences of actions, and can be either positive or negative to the original intent. Whereas negative consequences are those direct and indirect effects that cause unwanted damage, injury or casualties, certain positive aspects can generate outcomes that may support the ongoing course of action. Physical effects are direct, first-order effects that rest on direct impacts aimed at achieving physical alteration. Their primary purpose is damaging, destroying or disrupting. Functional effects can be direct or indirect effects that degrade the general ability of functioning properly. Systemic effects are indirect effects and aim at changing certain characteristics of specific systems or a set of systems. Psychological effects are those direct or indirect effects that focus on emotions, motives and reasoning in order to influence behaviour. There is also a natural linkage between effects, which may vary over time or in degree according to the situations.[110] Terms such as levels of employment or spectrum of engagement refer to the traditional levels of conflicts and can serve as a background for tactical, operational and strategic-level effects. Every conflict is interwoven with all sorts of effects that constantly influence each other.[111]

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[109] MANN–ENDERSBY–SEARLE 2001
[110] Ibid.
[111] Ibid.

3. Operations and Dimensions

The introduction of the seven publications made clear that proponents of the concept regarded effects-based operations as a superior employment of force. For them effects-based operations had the potential to achieve national security-policy goals not only faster and in a more comprehensive fashion, but also with the involvement of fewer resources. Thus it is important to see to what extent and at what pace the concept expanded into official milestone documents such as the various Defense Reviews and the Joint Visions of the era. The first such report was published soon after the Gulf War with Operation Desert Shield and Operation Desert Storm ended against Saddam Hussein's armed forces. It is equally important to spot reflections on effects-based operations aimed at making the concept digestible for practical purposes. The bandwith of reactions was mixed at best as this became evident by a rather sceptical U.S. Army interpretation detailing the possible shortcomings and weak points of the concept. The U.S. Air Force's interpretation was more enthusiastic as it detailed the benefits that can be gained through the application of effects-based operations.

3.1. Mixed Receptions

The first document was the *Report on the Bottom-Up Review.* Released in 1993, the intention was to help mould the strategy, size and shape of future military forces.[112] It was announced two years after the successful air campaign in Iraq. Although it attempted to define strategy, force structure, modernisation and other related areas, only a limited number of effects references can be found. It contains only general statements such as the ability to respond effectively to crises or the need to operate more effectively with allied forces. There is neither a reference to what desired effects are, nor how they should be achieved. The only aspects mentioned are accurate information on enemy forces, which are the prerequisite for effective joint operations and that precision guided munitions can dramatically increase the effectiveness of a fighting force. Airborne re-fuelling of aerial surveillance and control platforms is seen as a contributor of maximum mission effectiveness. Other references are mainly scattered statements, such as the enhancement of military forces increases the effectiveness of power projection, and a certain type of fire control radar system enhances the effectiveness of attack helicopters.[113] *Joint Vision 2010* was issued in 1996 and was meant to be a conceptual template to achieve new levels of effectiveness in joint war-fighting.[114] As General John M. Shalikashvili, Chairman of the Joint Chiefs of Staff remarked, Joint Vision 2010 was aimed at providing a benchmark for the evolution of the U.S. armed forces

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[112] Department of Defense 1993
[113] Ibid.
[114] Joint Chiefs of Staff 1996

in order to meet the requirements of a challenging and uncertain future. According to it, commanders were expected to create forces that can produce immediate effects leading to desired results. The document also emphasises the importance of advances in target-effect technologies that produce a broader range of weapons effects.[115]

Regarding the conduct of joint operations there was a shift from the traditional concept of massing forces towards massing desired effects. Effects of mass equal the concentration of combat power at decisive time and place that will be achieved with less force than in the past. As Joint Vision 2010 states, the ability to produce desired effects rests on the correct mix of assets and capabilities, which is enhanced by the enormous potential of advanced technology.[116] In terms of power projection Joint Vision 2010 proposes four new operational concepts such as dominant manoeuvre, precision engagement, full-dimensional protection and focused logistics. Dominant manoeuvre is defined as the application of overwhelming force to combine joint combat power more effectively. Precision engagement reflects the ability to generate and deliver desired effects from an extended range in order to lessen the risk to friendly forces and minimize collateral damage. Full-dimensional protection enables the effective employment of forces while denying the same to the enemy. Focused logistics is aimed at directly delivering tailored packages of logistics and sustainment at all levels of operations. These four new concepts result in full spectrum dominance and massed effects in the full range of joint operations.[117] The report of the Quadrennial Defense Review was released in 1997. This document went much further into an effects-based direction. The report comprehended the nature of threats and devised appropriate strategies and programs to defuse or defeat them.[118] It also attempted to separate fact from fiction, and purge antiquated assumptions from current realities in order to prepare the U.S. armed forces for an uncertain future. It spoke about new operational concepts and organisational arrangements aimed at enabling joint forces to achieve new levels of effectiveness in conflicts. In reference to Joint Vision 2010, the report understood precision engagement as the ability to deliver desired effects at the right time and place. Focused logistics was seen as the effective delivery of sustainment packages, which result in the overall effect of reduced logistics support. As for the U.S. Army, the document mentioned the effects of increased mobility, lethality and manoeuvre. In reference to the U.S. Air Force, it highlighted the ability to achieve desired effects with a minimum of risk and collateral damage. For the U.S. Navy, it emphasised that network-centric warfare significantly enables the services to achieve enhanced massed effects. There is further shift to observe towards an effects-based direction. Whereas the 1993 report spoke of an effective deterrent in the form of nuclear forces, this document uses the term deterrent effect when referring to the ability to respond to crises as they develop.[119]

Joint Vision 2020 was issued in 2000 and stated that the most effective force must possess full jointness in intellectual, operational, organisational, doctrinal and technical terms to make new technologies work. The document expanded on the conceptual template established by Joint Vision 2010. Its aim was to guide the force transformation process with the overall goal to create a force that could be dominant across the full spectrum of joint

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[115] Ibid.
[116] Ibid.
[117] Ibid.
[118] Department of Defense 1997
[119] Ibid.

operations.[120] Full spectrum dominance, with the four operational concepts as enablers were retained. Only information superiority was extended and seen as the pivotal factor that gives competitive advantage over the enemy if effectively translated into knowledge and decisions.[121] Dominant manoeuvre rested on the capability to scale and mass forces and effects of fires as required in the operational theatre. Potential and actual effects result in control of the battlefield at the right time and place. Precision engagement was further refined and understood as effects-based engagement, which was seen as relevant to all sorts of operations. Linking sensors with kinetic and non-kinetic delivery systems provides the commander with desired lethal or non-lethal effects that support campaign objectives. Focused logistics was seen as the effective link between the operator and the logistician in all logistics functions with the result that operational effectiveness and efficiency increases. Full dimensional protection was understood as an integrated architecture that effectively manages risks to the joint force and its assets, and results in increased freedom of action and better protection at every level.[122] A further enabler of full spectrum dominance was the extended concept of information operations in which desired effects and required actions served as variables. The concept of joint command and control was regarded as most effective when decision superiority exists. The increasing tempo of operations requires quick choices among weapons and effects, in which the emphasis is on parallel planning and execution.[123]

The *Quadrennial Defense Review Report* was released in 2001. It stated the possibility to identify threats and avoid surprise, but also mentioned the importance to learn to expect it. Thus the aim was to establish a new strategy that could embrace uncertainty and contend with surprise. According to the report transformation was not seen as a goal for tomorrow, but as an endeavour that must be embraced today.[124] The introduction of the capabilities-based model as basis for defence planning aimed at increasing the war-fighting effectiveness of the forces and indicated processes that deal with uncertainty. The new model helped to provide capabilities suitable for a wide range of challenges and circumstances within an economic framework necessitating choices. It contrasted developing forces with specific threats and scenarios with a general emphasis on flexibility, adaptiveness, and robustness.[125] One stated defence policy goal in the report was to dissuade future military competition with the dissuasive effect coming from the combination of technological, experimental and operational activities. Another key objective in force transformation was understood as strengthening forward deterrent postures that rests on improved capabilities of forward forces. The resultant deterrent effect in peacetime came from capabilities that impose strategic and operational effects on the enemy.[126] Force transformation was understood as effects-based. The document regarded a small amount of transformed forces a factor that could produce disproportionate strategic effects for further transformation. Also the requirement of forces to be networked was mentioned to help maximise combined effects.[127]

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[120] Joint Chiefs of Staff 2000

[121] Ibid.

[122] Ibid.

[123] Ibid.

[124] Department of Defense 2001

[125] DAVIS 2002

[126] Department of Defense 2001

[127] Ibid.

These milestones documents reflected a gradual shift from a traditional, threat-based, firepower-centric, attrition and annihilation-oriented employment of force towards a more sophisticated approach. As a result, members of the services wanted to fill the concept with practical knowledge. Although Joint Vision 2010 emphasised the importance of balanced and sustainable capabilities, and Joint Vision 2020 clearly stated that wars should not be expected to be won easily and without bloodshed, representatives of the U.S. Army feared that effects-based operations could cause an imbalance in the traditional role of the services and showed clear scepticism.[128]

A prominent representative of the U.S. Army regarded effects-based operations as nothing more than a technological silver bullet with which proven and balanced battlefield capabilities could disappear. The technological potential of precision strike weapons was a dangerous fallacy that negates the human dimension of warfare.[129] For him only fully balanced capabilities could become a solid basis for strategy and result in an overwhelming advantage on the enemy. The right balance of dominant manoeuvre and precision engagement must be retained since the power that smashed the Iraqi forces came from the successful combination of precision engagement and dominant manoeuvre. Although increased lethality and mobility were impressive, only balance provides for choices. Manoeuvre and fire are still the primary elements of combat power. Precision engagement, although a significant contributor to shape the battle space, does not accomplish all tasks. The synergism that comes from the simultaneous application of dominant manoeuvre and precision engagement is still critical. Any dependence on a one-dimensional strategy such as effects-based operations negates the possibility to achieve decisive effects that come from positional advantage and psychological impact. Purely technical solutions cannot eliminate the irrationality of war and relying on technology alone does not provide for appropriate strategy, doctrine or operational concepts.[130] Likewise, other representatives of the U.S. Army did not support the concept as the concept reflects nothing more than the long-lasting desire of the air service to become independent and commanded by an airman.[131]

The information-intensive nature of effects-based operations could overload commanders and planners, and result in an over-centralised command. The concept also performs badly when the enemy reacts, deceives or otherwise manipulates information. The Clausewitzian understanding of compelling the enemy to do our will also cannot be realised with effects-based operations. The term is synonymous with control, which means that the enemy has space for making his own decisions. Thus effects-based operations stand for a concept that is impersonal, fleeting and persuasive from the enemy's point of view. Consequently, it is ill-defined as close combat would still be the final arbiter of war.[132] Members of the U.S. Air Force saw the concept as the modern version of the German Blitz. The key to joint effects-based operations was a theatre team using airborne command, control, intelligence, surveillance and reconnaissance systems to manage the decentralised executions of air sorties against enemy land forces.[133] Since the concept is

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[128] Joint Chiefs of Staff 1996; Joint Chiefs of Staff 2000
[129] REIMER 1996–97
[130] Ibid.
[131] CHEEK 2002
[132] Ibid.
[133] BINGHAM 2001

asymmetric, joint operations would not depend primarily on physical attrition dominated by close battle. The use of friendly land manoeuvre has the function to exploit the physical and psychological effects of air attacks on the enemy. Battle management capabilities based on advanced technology make it possible to paralyze the enemy by attacking his mechanized assets. Effects-based joint operations reduce or eliminate close combat in three ways. First, they halt enemy army units before getting close enough to friendly land forces to employ their weapons effectively. Second, they allow friendly land forces to avoid close combat in less than ideal conditions. Third, the applied advanced technology provides real-time information to effectively manoeuvre friendly land forces.[134] Joint effects-based operations take advantage of the central role motorisation plays in modern land warfare. The concept exploits dependence on movement and machines by acknowledging that all armies depend on vehicles to move units to the and on the battlefield.[135]

Advanced airborne technologies are able to see moving or emitting machines in real time regardless of darkness or bad weather. Information on location and strength of enemy army units become more reliable and precise. Precision engagement can paralyse the enemy's land forces and reduce his ability to engage friendly army units in close combat. Targeting vehicular movement can cause confusion in the form of shock and awe since surviving enemy soldiers would regard movement and massing vehicles as visible, vulnerable and extremely dangerous. Thus sudden and lethal air attacks together with friendly manoeuvres result in a vicious circle with a synergetic effect. Any attempt to escape would cause visible vehicular movement that again increases the vulnerability to air attacks. The aerial aspect of effects-based operations comes close to vehicle plinking that is followed by friendly manoeuvres bypassing or defeating paralysed enemy units.[136] The dynamic integration of precision air attacks and surface manoeuvre results in the complementary effects of an intractable dilemma. Whereas moving units invites precision air and missile attacks, not moving means being overwhelmed by friendly air and land forces. The rigorous exploitation of movement and human factors such as fear, fatigue and uncertainty result in quick victory on land. The enemy is reduced to infantry that does not enjoy the advantage of motorisation. Precision weapons not only make joint actions more effective and efficient, but increase the perception of danger that friendly actions produce.[137] Consequently, effects-based operations help achieve system-wide effects without the destruction of significant parts of the enemy system. Advanced technologies enable the accurate location, automatic tracking, reliable characterisation and precision-targeting of individual enemy vehicles and make the realisation of the concept possible.[138] Effects-based operations eventually penetrated to the highest echelons of political and military leadership. As General Ralston, Commander U.S. European Command and Supreme Allied Commander Europe in 2000–2003, expressed during a conference, everybody must think in terms of achieving desired effects and transition from attrition-based force on force warfare to effects-based operations.[139]

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[134] Ibid.
[135] BINGHAM 2002a
[136] BINGHAM 2001
[137] BINGHAM 2002a
[138] BINGHAM 2002b
[139] RALSTON 2002

3.2. Increasing Generalisations

The seven approaches to effects-based operations made it clear that there were various levels of interpretation all pointing towards an increasing generalisation of the concept. Originally, effects-based operations stood for a service-centric force employment concept and grew out of the necessity of how to compensate for the scarcity of available resources. During the preparation of the Gulf War Americans possessed only a limited number of F–117s. However, intelligence sources discovered that instead of two key command centres there were actually four in Iraq, and potentially a fifth in Kuwait. Based on the capabilities offered by stealth technology and precision weaponry, they redesigned the Master Attack Plan and put only one weapon on every facility. This change resulted in higher efficiency and a greatly amplified coverage in terms of impacts over the enemy. With the revision it became possible to attack 150 separate and discrete targets in the opening first 24 hours of the war, far more than during the 1942–43 bomber offensive over Central-Europe.[140] Based on the results of this war the idea of achieving effects on the enemy slowly expanded as the emphasis moved from the concept of massing forces to massing effects. Massing ground forces in a traditional manner was no longer seen as important as they represent a lucrative target for attacks. As Gen. Deptula emphasised the concept redefined the meaning of mass, relied to a greater degree on force projection, and aimed to control adversary systems. All this required changes in the existing approach to force management and demanded new organisations and doctrine. Jointness was filled with a new meaning as not the most effective force for any given situation was required. Jointness stood for the right force, at the right place, at the right time and not using every force, every place, all the time.[141]

    For many, effects-based operations not only provide for a perspective and framework in planning, executing and assessing joint operations, but also have the power to integrate all elements of national power. This further generalisation suggests that all services operate as part of a bigger, joint interagency effort within a multinational ad-hoc coalition or an alliance.[142] Effects-based operations became a sort of springboard for better integrating the diplomatic, informational, military and economic elements of national and international power. Desired effects determined engagement methods in which the military force was only one element in the full spectrum of options. The integration of all elements of national power meant that traditional borders between military and non-military activities evaporated and an entirely new horizon for better achieving security policy goals opened up.[143] The performance of stealth technology and precision weaponry drove many to conclude that effects-based operations were also helpful in making decisions on resource allocations and defence spending. There should be a refocus from individual platform costs and considerations based on cost per target engaged or cost per desired effect achieved which must come to the fore. This reorientation meant that the evaluation of combat systems could be based on terms such as functionality of effects brought to accomplishing national security needs.[144] These broadest generalisations indicated an operational level force employment

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[140] *Air Force Operations Concept* s. a.; Mann 1993
[141] Deptula 2003b; Lambert 2003
[142] Deptula 2001
[143] Deptula 1995
[144] Wolfe 2001

concept to be suitable to define the nature and type of forces that must be sustained in order to deal with emerging challenges. This generalisation of the concept indicated significant consequences for the composition of the armed forces of the future.[145]

3.3. Theoretical Framework

The comparison of the seven approaches helps find those common elements and characteristics that are needed to construct a general theory of causality in joint operations. As mentioned earlier the attributes of the concept can be grouped around three common, but interrelated elements such as effects focus, advanced technology, and systems thinking. The introduction of the seven approaches also made the characteristics upon which the common elements are built, clear. These are causality/deduction for effects focus, intangibles/control for advanced technology, and categorisation/analysis for systems thinking. These characteristics stand for loose ideas that bear dangerous simplifications regarding the nature of war. The focus on direct causality emphasises almost exclusively the strategic level, and similar to the mainstream literature dealing with the Revolution in Military Affairs, no particular attention is devoted to the tactical level. The concept of effects-based operations is fed by the unconditional belief that advanced technologies make it possible to look at the whole and neglect the particular.[146] Despite sporadic references to the Clausewitzian friction of war, most approaches give us the impression that both technological prowess combined with an analytical, top-down methodology emphasising clear causality, can turn war into a logically solvable phenomenon. Another problem concerns the term *effect*. The approaches made it clear that the concept centres first and foremost on achieving effects on the enemy. Common wisdom and academic knowledge indicate that this term can have multiple meanings that do not promote precision and clarity in military language.[147] One critical observer ironically remarked that if the proponents of the concept were aware of the many different meanings and usages of the term, it is more than doubtful that they would have made it the first choice among the words they used.[148] The diversity of the effects taxonomies in terms of categorisation is bewildering. They allow for a twofold ordering, which indicate general and particular attributes. Effects can be recognised either immediately or after a certain time has elapsed. In case of simple physical effects, time can be instantaneous or short. Higher order effects need longer time to mature. It follows from the categorisation that achieving physical effects is rather easy to do and recognise. Achieving and recognising psychological effects is far more difficult. A general subdivision can be defined by intention, order and timing. Intention means that an effect can be intended/desired or unintended/undesired. In terms of order, effects can be direct/first order or indirect/higher order. Timing indicates effects to be permanent or temporary. The particular subdivision rests on level, type and flow. Level refers to tactical, operational and strategic effects. Flow reflects the distributive character of effects and describes the way they flow up or down within the enemy system's hierarchy. The difficulty of handling psychological effects is

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[145] Deptula 1995
[146] Jobbagy 2006
[147] Gove 1981
[148] Riper s. a.; Riper 2006

also reflected in the gap between effect understood in normal English usage and effect as conceptualised in the taxonomies. An effect normally follows an antecedent directly, which means that any reference to indirect or higher order effects becomes questionable at best and nonsensical at worst. The more one moves towards intangibles in the form of higher order effects, the more one leaves effects-based operations behind, and arrives at something that can better be described as consequence-based, outcome-based or event-based operations. The more one moves towards abstract psychological effects aimed at influencing the enemy's behaviour, the more meaningless the term effects-based operations becomes. In the same way Clausewitz also pointed out that whatever one does in war, consequences of some kind would always follow.[149]

As Clausewitz indicated regardless what one does, effects are achieved anyway. This means that not only the term effects-based operations may be vacuous, but also the concept behind it. This bears the risk to refer to something that is scarcely more than military truism or commonplace. Many ideas are often passed on down without proper consideration or reflection and it appears that the same holds true for the concept of effects-based operations.[150] To elaborate more in detail on the obstacles and opportunities of the concept a theoretical framework is suggested. It helps systematically challenge wide spread and obsolete thoughts regarding the nature of causality in joint operations, and the problems it creates. Clausewitz emphasised that the nature of war is complex, and with the proposed theoretical framework it is possible to establish a basis to analyse it in terms of causality. Although the problem of causality in war lends itself to further metaphysical and epistemological considerations, the intention here is only to analyse certain properties in broad terms. Discussing joint operations on the basis of cause-and-effect relationships stands for a long and complex intellectual path of study and continual analysis.[151] The framework is thus an attempt to produce a durable explanation of war's nature in terms of causality and the way cause and effect relate to each other in space and time. It is generic in a true Clausewitzian sense that first and foremost, instead of a complete theory, it just offers material for one. Probably the biggest benefit of such an approach is that it helps understand joint operations in causal terms and, as Clausewitz emphasised, to investigate the essence of war and to indicate links between these phenomena and the nature of their parts.[152]

The theoretical framework can be seen as a tool that helps develop knowledge to distinguish error from truth. It is useful to analyse and critique assumptions regarding causality in joint operations. A further benefit comes from the fact that this way it becomes possible to examine the nature of causality in stages working both from narrower to wider settings and vice versa. Thus it is possible to establish a context for examining causal relations, which is sufficient in detail and realism to discern relationships between factors.[153] Seeing causality in joint operations on a continuum as offered by the framework as depicted in Figure 1 will help clarify military thinking in a way that false assumption regarding causal relationships can come to light.[154] According to Clausewitz, a conceptual

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[149] Clausewitz 1993
[150] Moseley 2002
[151] Ibid.
[152] Clausewitz 1993
[153] Rubel 2006
[154] Lopez–Comello–Cleckner 2004

embodiment reflects the fact that causality can both be inherently imaginative, and formed through experience. Thus the properties of cause-and-effect relationships in joint operations are consequences of imaginative capacities and the experience of the physical environment that accommodates action. The framework also offers room for conceptual categorisations in a way that different factors can be linked around common properties. Consequently, it can explain how factors that are ostensibly different can be unconsciously connected.[155]
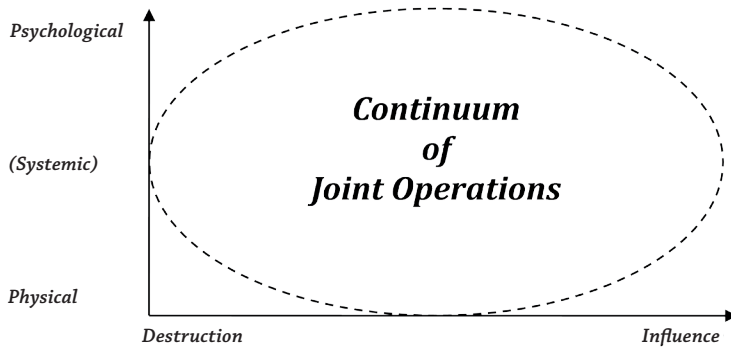

Figure 1.
Continuum of joint operations

Source: Drawn by the author

Joint operations consist of so many factors that most efforts fail to include all applicable forces with the complexity of their interactions. They stand for activities in which both the enemy's physical and psychological forces have to be destroyed. Whereas the destruction of the former can be seen as the means of war, the latter is its objective. Clausewitz advocated that efforts had to be aimed at the enemy's power of resistance, which was the total means at his disposal and the strength of his will. This indicates that a war can end only if the enemy's will is broken through a gradual exhaustion of his physical and moral forces.[156] In a similar fashion the taxonomies of the seven approaches refer to two different, but interrelated domains of war called the material and the non-material in which effects can be achieved. As Clausewitz put forward the two domains display war as an extreme trial of moral and physical strength and stamina in which actions aim at the gradual exhaustion of the enemy's physical and moral resistance.[157] The theoretical framework as depicted in Figure 2 indicates that unlike the seven approaches to effects-based operations that put mostly an unilateral emphasis on the moral element, the moral and physical elements are regarded as both inseparable and interacting. The only difference according to Clausewitz is that the moral element is the most fluid element.[158]

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[155] JOHNSON 2005
[156] CLAUSEWITZ 1993
[157] Ibid.
[158] Ibid.
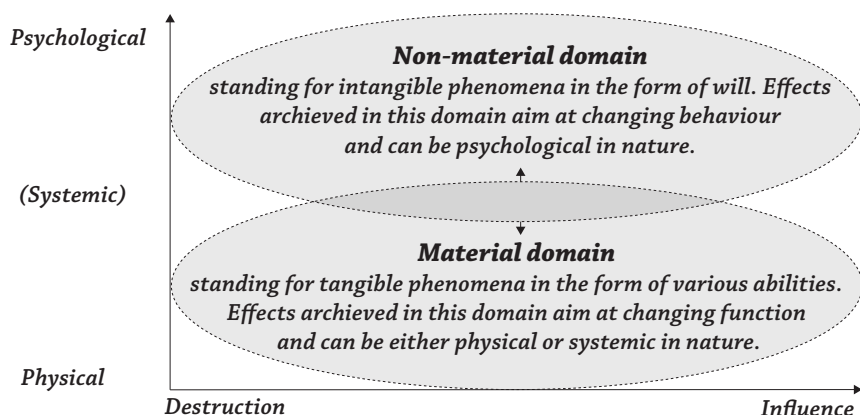
Figure 2.
Domains of the continuum

Joint operations thus can be depicted in a two-dimensional setting as a continuum, which is defined by ends/means relationships. This framework indicates joint operations as a phenomenon that works in an everything-affects-everything mode and makes various levels of interrelatedness possible. This allows room for both loose and tight structures that exist side-by-side in war. Whereas ends are depicted on the vertical axis characterised by the combination of physical and psychological effects, the means are located along the horizontal axis and range from destruction to influence. The framework indicates that effects occur on a spectrum characterised both by tangible and intangible attributes. Clausewitz also indicated the existence of a material and non-material domain, by emphasising that war is a trial of moral and physical forces through the medium of the latter in which psychological forces exert a decisive influence on the elements involved.[159] Based on the taxonomies, the framework and Clausewitz's advice, the following can be proposed in terms of effects. The material domain represents categories such as physical strengths and stamina. It describes the space the military tries to influence through combat and manoeuvre. Consequently, the material domain deals with tangible items the enemy usually needs to wage war. It includes assets such as physical platforms and communications networks. This domain is the traditional basis for measuring combat power, which has to be rendered inoperable. The material domain can also be described as reality proper. Attempts to achieve effects in this domain must aim at the physical ability and as a consequence serve the purpose of changing functions. The non-material domain on the other hand, is characterised by psychological factors such as moral strength and stamina. It represents the mind and attributes that generally influence the will in the form of perception, awareness, understanding, belief and values. Effects in this domain stand for influencing intangibles the enemy needs to wage war. Consequently, effects in this domain serve to change behaviour. When compared to the material domain, the non-material domain appears to be non-existent. However, by holding things together it

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[159] Ibid.

permeates all endeavours in joint operations. It is the medium in which act and will merge, and points towards the ability and movement to act. Despite the difference regarding the two domains, there is a strong correlation between them as physical and psychological factors form an organic whole.[160] Whereas Clausewitz regarded the physical the wooden hilt, the psychological was for him the real weapon, the finely honed blade.[161]

3.4. Delivering Definitions

According to the theoretical framework, effects can point either to the tangible aspects of war aimed at changing function or to intangibles such as changing behaviour. Whereas the former refers to the tactical level of war, the latter refers to the strategic level. In order to fill the continuum between the two, the term systemic effect as indicated by some proponents of effects-based operations appears to be appropriate. Systemic effects similar to the operational level of war link the two end-poles in various ways expressing the fact that effects can flow freely between them. The taxonomies also made it clear that effects have a distributive character as they flow from lower-order to higher-order status and vice versa. In other words, effects are interrelated entities, which form an organic whole.
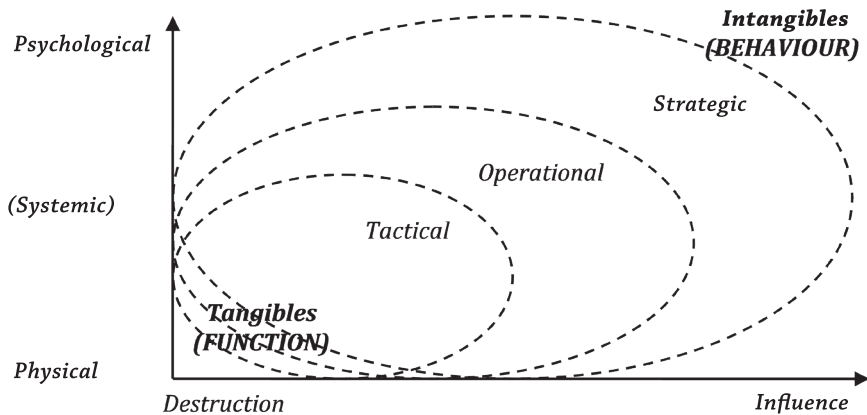

Figure 3.
Effects as interrelated phenomena

Source: Drawn by the author

Therefore, the author suggests depicting the relationship of effects in the form of three distorted rings as shown in Figure 3 each referring to one distinct level of war. Based on the seven approaches it becomes possible to state that achieving an effect requires the involvement of a dynamic and a static component. Whereas the dynamic component stands for the action, the static component is the object upon which one acts. This approach provides for a broad

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[160] Alberts et al. 2001; Huss 1999; McNicoll 2003
[161] Clausewitz 1993

framework in which causality can be seen as an expectation for certain events to result after the other events preceding them. Thus causality in joint operations is approached in a true Humean manner. According to him causation stood for such a connexion, as to give us assurance from the existence or action of one object, that it was followed or preceded by any other existence or action; nor can the other two relations be ever made use of in reasoning, except so far as they either affect or are affected by it.[162] Approaching cause-and-effect relationships this way also helps understand the mechanism of achieving an effect in which *(E)* can be understood as a function *(f)* of an action *(a)* on an object *(o),* and depicted in the form of a simple equation such as:

$$E = f(a,o)$$

In order to explain the equation first, it is suggested to analyse the term *object* in more detail, as according to common wisdom object as a generic term appears to fit better to actions than other frequently used terms such as *target* or *agent.* Target is very much destruction oriented, and has an exclusively military connotation. It is mainly associated with the application of kinetic means and stands for destructive assets such as platforms, weapons, and explosives. Agent is fleeting and too neutral in nature. It is either associated with the material dimension of war and means an instrument to achieve a result, or with the human dimension and stands for acting or exerting power. Object describes something that is materialised in its nature and can be an element of a system or the system itself. Thus it does not make a difference, whether an object is a living or a non-living entity. It stands for perception by the senses and indicates something that can be seen, smelled, heard, tasted and/ or touched. Simply put, an object is nothing more than a cause for attention. It can not only refer to systems, sub-systems and elements, but also to their relationship. Consequently, an object can also be a process that is in the material domain, but is not materialised and possesses no physical characteristics such as size, shape and weight. In this sense a radio transmission that can be jammed can also be regarded as an object. A thorough systematisation of effects in joint operations also requires clear definitions in order to turn the loose similarities found in the seven approaches, and expressed in common elements, into a neat theory. Thus effects-based operations can be defined as a force employment concept aimed at achieving effects on the enemy, which is enabled by advanced technology and a systemic approach. In a similar fashion, an effect can be defined as a physical, systemic or psychological resultant condition, aimed at inducing functional and/or behavioural changes of the enemy. For a better understanding of joint operations in terms of cause-and-effect relationships the author suggests a theoretical framework in which war is depicted as a continuum defined by ends/means relationships. The common elements and characteristics discerned indicate that the main focus of effects-based operations is somewhere around the psychological/influential end-pole as depicted in Figure 4. Consequently, effects-based operations can be located in the upper right area in the continuum of war. The figure also allows addressing the three sorts of effects as outlined above in more detail. A physical effect is regarded mainly as the outcome of a certain action or actions on an object that alters the object's physical condition through modification or destruction. A systemic effect can either

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[162] Hume 1978

be the product of some physical effect or the outcome of certain actions on a system, which alters the system's performance through modification or destruction. A psychological effect may be the outcome of the interplay of certain physical and systemic effects, or some actions aimed at the enemy's cognition in order to alter his perception and induce a behavioural change. Although physical effects are normally associated with the tactical level of war, to a lesser degree they may also have systemic and psychological consequences. Systemic effects are mostly associated with the operational level of war as they have both physical and psychological attributes. A given amount of physical destruction can cause systemic effects or such effects can be the result of operations collapsing certain functions that help maintain the enemy's war-making or war-sustainment capabilities. However, psychological effects can also result in systemic effects as it was the case with Iraqi power plant directors who feared bombardments and shut down their facilities as soon as an F–16 took off.[163]

The proposed theoretical framework suggests effects to be inherently complex and interrelated. Although both causes and effects can be identified in advance, objects and actions can theoretically be fully known, the mechanism needed to achieve desired effects always contains an amount of uncertainty.[164] This is also addressed in most approaches, and can be described as the vulnerable Achilles-heel of effects-based operations and the underlying assumption of decodable causal relationships in war. As the focus moves towards higher order psychological effects, it becomes increasingly difficult to identify causal linkages. Whereas causes can be seen as limited proposition-like facts, effects refer to actual changes and processes that can go on indefinitely. Joint operations stand for phenomena in which it is never possible to do only one thing in isolation. The enormous array of lethal/non-lethal, kinetic/non-kinetic, military/non-military interactions generates endlessly complex alternatives that make it very difficult if not impossible, to isolate individual causal relationships. It seems that the higher the complexity of the situation encountered, the lower the ability to detect useful causal relationships, and at a certain threshold there might be characteristics that are almost mutually exclusive.[165]

[163] DENNY 2003
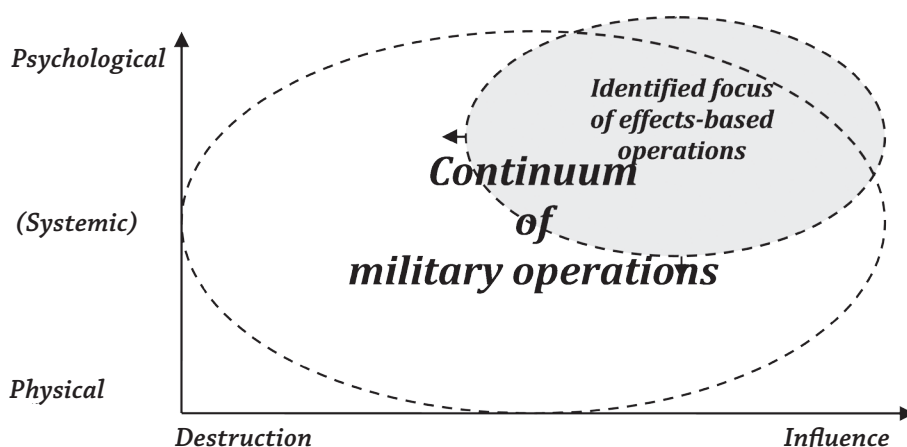[164] EMMET 1984
[165] STORR 2005

Figure 4.
Effects-based operations in the continuum of war

Source: Drawn by the author

This sheds light also on the problem that stands for the subtle difference between exactness for which causes stand for and correctness representing effects. Whereas causes can mostly be verified through direct experimentation, effects can only be postulated from theories not amenable to direct proof. In other words, desired effects are nothing more than extrapolations of a known past onto an unknown future. Humans tend to see the relationship between past and future in causal terms and tend to think that the past offers room for more reality than the future may yield.[166] Human behaviour allows both for stochastic and functional associations, which mean that the consequences even of repeated actions are never constant, but cover a range of possibilities. Although on occasion a sufficient knowledge of the possible consequences might exist, or there is an adequate knowledge for estimating certain statistical probabilities of some possible consequences, it will never be possible to predict with certainty the consequences in any particular action. Hence there will never be possible to define completely homogenous categories or categories with sufficient homogeneity that allow for accurate predictions based on causality. The problem with the frictional mechanism of war and joint operations further indicates that one has always to expect a deviation between the effects desired and the effects achieved. Past experience might allow for discerning general rules, but helps little in anticipating the direction and extent of deviations. A mechanism that was successful under a given condition to achieve an effect will not obviously be successful under all conditions. Regardless the information at disposal, one can attend to only some aspects of a situation, but never to all aspects. Joint operations indicate complex interactions in which even the actions of one belligerent have ramifications. Consequences are never restricted to the area they were originally aimed at, but might occur in areas that are interrelated, though ignored at the time the action was

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[166] SAKULICH 2005; HORVICH 1987

taken. Predicting the consequences of complex interactions is also problematic since the prediction itself can become an important new element that influences the initial course of actions. As soon as desired effects become explicit and actions proceed, the general assumption of other-things-being-equal is no longer valid. The introduction of new other things in the form of desired effects, points towards inconsistency, which often account for unforeseen, unexpected and unanticipated consequences.[167]

Effects-based operations suffer from semantic problems, which in the end mystify ideas rather than help clarify them. The concept reflects the tendency to explain a complex human phenomenon such as war in the framework of a causal nexus, composed of a network of causal processes and interactions. Humans tend to confuse the nature of change with the causation of change. Generalisations relating causes to effects can only be true in one or at best in some of the underlying properties. As soon as the properties blur in spatial and temporal terms, no disposition can deliver useful generalisations. In such cases rethinking in terms of co-variation or correlation is required rather than imposing whatever sort of artificial causality.[168] Both co-variation and correlation stand for phenomena that follow one another in a regular fashion, but do not imply causal relationships per se. Nevertheless, people tend to interpret cases of co-variation and correlation as manifestations of causality. They are too ready to assume causality and often confuse causation with co-variation and correlation.[169] The problem of finding useful mechanisms points towards at least four limitations that must be considered and run against the cause and effect focus of effects-based operations. This first is the need to understand the enemy as fully as possible, the second is the need to understand causal relationships between actions and higher order effects, the third is the ability to assess the consequences of actions taken in terms of enemy will and behaviour, and the fourth is to synchronise our actions with the different requirements demanded by the various levels of war. Regardless what mechanism is selected, the proverbial friction as outlined by Clausewitz works against detecting clear causal relationships. Friction in joint operations indicates variation in terms of causal relationships. This variation is due to the fact that friction does not allow for discerning something that can be seen as absolute.[170]

Despite the optimism found in the seven approaches to effects-based operations regarding the ability to link causes and effects directly and comprehensively, one must bear in mind that absolute objectivity, clinical accuracy and precision in joint operations to map causation are unattainable ideas both in general as outlined by Hume, and in particular, which is war and joint operations.[171] Figure 5 depicts the problematic aspects of friction that works against the chance to find causal constructs in joint operations. Most mechanisms (a^1o^a to a^6o^f) are physical operations that aim at achieving effects in the physical domains (E^{11} to E^{14}). It is assumed that these effects may indirectly induce higher order subsequent effects both in the material (E^{21} to E^{24}) and non-material domains (E^{31} to E^{33}). Some mechanisms can also achieve systemic effects directly (a^5o^e to E^{24}). A more complicated mechanism in psychological operations (a^7o^g) for example, may initiate effects in the non-material domain directly (E^{34}). Effects may both cascade (from E^{11} to E^{21} and E^{22}) or become cumulative (E^{11}, E^{12} and E^{13} to E^{22}) as they move

[167] MERTON 1936; GOVE 1981
[168] ABDOULLAEV s. a.; MCCULLAGH s. a.
[169] CHENG 1997
[170] MCCRABB s. a.
[171] BEAUMONT 1994; HUME 1978

through the enemy system. Effects may also jump through the various levels of war (E^{14} to E^{33} and E^{15} to E^{34}) displaying the fact that according to fortunate circumstances even simple physical effects can have disproportionate consequences. In effects-based operations higher order effects can influence lower order effects (E^{31} to E^{22}). Effects on the same level may also be interrelated (E^{21} to E^{22}) as they can also mutually enforce each other (E^{31} and E^{32}).
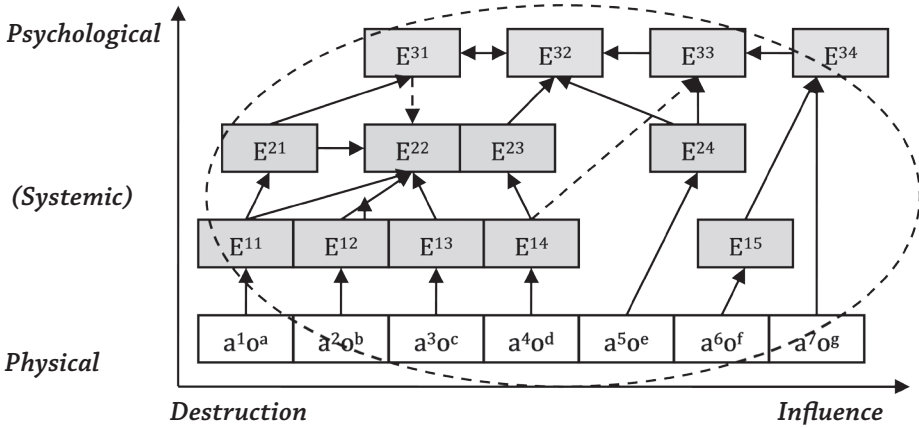

Figure 5.
Mechanism and the propagation of effects

Source: Drawn by the author

As the figure indicates mapping cause-and-effect relationships in joint operations is even theoretically very complex. Friction hinders most attempts to predict which cause results in what effect. Attempts that focus on detecting causality can easily result in paralysis by analysis, especially in terms of desired higher order effects in which causal relationships are usually not directly identifiable. Another problem concerns the relationship between decision-making and time. In general, the shorter the time available to make decisions the more likely it is that one thinks in terms of a relevant analogy rather than look for alternatives based on a sophisticated analysis.[172]

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[172] SMITH 2006

4. Dimensions and Coercion

Many of the introduced approaches to effects-based operations contain statements that the concept is far from being new since astute commanders, statesmen and the like have always practiced this sort of operations.[173] This chapter examines the truth behind such assumption. The problem with simplified statements of this kind is that they indicate a generalisation that de-emphasises specific social, political, cultural and economic factors that have always been important in the conduct of joint operations. All the phenomena that support war, including organisations and conventions depend on a combination of certain historical circumstances. As the social wave-front analysis indicates, manifestations of war is the result of societal transformation and mirrors social conditions.[174]

4.1. Mainstream Thinkers

The danger of superficial generalisations is that they can turn any given phenomenon into its own caricature, and logically meaningless. Clausewitz warned that if an idea becomes diffuse, it starts losing proper meaning and its value declines accordingly. Certain principles of joint operations can survive ages or can be rediscovered occasionally. However, the main reason for their endurance is often not due to their value or utility, but their simplicity and exceptional convenience. Strategic theory is always a framework, and as such independent from the size and scale of the conflict, the medium that hosts it, the means by which it is fought, and likewise the amount of violence it involves. In general, it is the combination of efficiency and effectiveness with the aim of finding a balance between these two attributes. It follows a mostly deductive logic whereby a conclusion about particulars flows from a course of actions rooted in a general or universal premises.[175] The term *effect* refers to resultant conditions that follow an antecedent and explains why strategy can be understood as effects-based. Consequently, references to effects-based operations as an ancient phenomenon point towards strategy in general terms rather than the existence of an early version of the concept. Displaying effects-based operations as an ancient concept explains everything and nothing at the same time. Therefore, it is useful to take a close look at the vocabularies of significant past theorists of war and examine to what extent their works can be regarded as precursors to the concept of effects-based operations. The comparative analysis that follows does not intend to deliver a broad historical, philosophical, cultural or even linguistic overview. The intention is to allow the respective authors to speak for themselves as they represent different periods within the first two waves. The aim is to detect reference points that display the three common elements of effects-based operations such as

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[173] Crane 2001; McNicoll 2003
[174] Toffler–Toffler 1993; Creveld 1991
[175] Clausewitz 1993; Brodie 1949; Creveld 1991; Robbins 1987; Hooker 2005

effects focus, advanced technology, and systems thinking. Four theorists of war belonging to the mainstream military literature will be subject to this analysis. The Chinese classic Sun Tzu representing ancient China, the Italian Niccolo Machiavelli representing the Italian city-state of the late Middle Ages, the Swiss Antoine Henri de Jomini and the Prussian Carl von Clausewitz, both representing the emerging modern nation state.

The ancient Chinese strategist Sun Tzu lived around 500 B.C. and belongs to the earliest known military theorists. His book *The Art of War* became known in Europe shortly before the French Revolution. Its summary translation was first published in Paris in 1772 and soon became widely circulated.[176] Sun Tzu is the first known theorist who attempted to formulate the planning and conduct of war on a rational basis that enabled a successful prosecution. In the chapter on strategic assessment, he emphasised that intelligence was required to change plans effectively. He also wrote about effective discipline by stating that subordinates do not dare to disobey orders which were effective. Sun Tzu also mentioned effective armament together with carefully chosen and trained troops. As an effective method he suggested appearing weak whilst being strong, and appearing cowardly whilst being brave in reality. In order to confuse the enemy, he mentioned the importance of giving the impression of being incompetent and ineffective whilst the opposite was true. Sun Tzu concluded that formlessness was the most effective in war and unexpected movements the most efficient.[177] In the chapter on planning a siege, Sun Tzu wrote that the inability to deploy machines effectively could cause great trouble. For him there was also a difference between military and civilian life, especially in customs regarding military procedure and command in effect. He found that adaptation to the situation was important as sometimes even a large group could not effectively attack a small group. Conquest depended for him on co-ordination and not mass.[178] In the chapter on formation, Sun Tzu wrote that sometimes there was no chance to see any effective way to attack, and defence was the better option by not letting the opponent find own forces.[179] In the chapter on force he concluded that good warriors sought effectiveness in battle from the force of momentum and not from that of individuals.[180] In the subsequent chapter on emptiness and fullness he proposed attacking gaps and, among others, he mentioned the inability to affect rescues. The ability to affect rescues meant for him fullness, which he regarded as worth defending.[181] In the chapter on terrain, he named six factors that resulted in defeat and one of them was the ineffectiveness of law and order.[182] In the chapter on nine grounds, Sun Tzu wrote of an effective rulership, which rested for him on firm knowledge regarding the enemy's plans, the lay of his land and the use of local guides.[183] In the chapter on fire attack, he suggested not to go against the momentum of fire, because it was not effective as the enemy would surely fight to the death.[184]

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[176] TSE 1772
[177] TZU 1988
[178] Ibid.
[179] Ibid.
[180] Ibid.
[181] Ibid.
[182] Ibid.
[183] Ibid.
[184] Ibid.

The Italian thinker Machiavelli published his book *Art of War* in 1521. As a renaissance person living in the city state of Florence, he viewed military problems in relation to politics. He devoted great attention to the procedures he regarded important for the acquisition, maintenance and application of a well-equipped and highly trained military force. He suggested adapting the military practices of the ancient Romans, but also pointed out the difficulties of accomplishing it. Machiavelli outlined fundamental questions such as creating an army, individual armaments and organisation of military units, formations in battle and during marches, command and control, encampments, intelligence operations, and fortifications and sieges. In book one he suggested that the military should be made up of people who were not fully forced or fully committed to this profession. An army composed only of committed people would carry wicked effects as such people were for him without restraint and religion, like gamblers or blasphemers. Machiavelli concluded the middle way to be the best when people join the military due to their respect for the prince that prohibits bad effects arising.[185] In book three whilst detailing the order of battle of the ancient Romans, he mentioned that lightly armed men were posted in front of the army between the cavalry and infantry. When they were repulsed they could withdraw along flanks or through intervals ordered to such an effect and re-establish themselves among the unarmed people.[186]

Regarding the signs on the flags of the army, Machiavelli proposed that the captain-general should bear the sign of the prince. The signs of subordinate commanders were not that important for him as long as they had the effect of recognising each other.[187] In book five he detailed the marching order of the Roman army. According to Machiavelli, the Romans sent ahead some groups of cavalrymen followed by the right horn, then by the wagons belonging to it, followed by one legion and its wagons, another legion with its wagons, the left horn with the wagons behind and then the rest of the cavalry. After this listing he concluded that this in effect was the mode in which the Roman army marched ordinarily.[188] For marching through a hostile country he suggested the army to be in a square since this formation was good both for marching and fighting, and to this effect he proposed ordering a brigade in the same way.[189] In a situation when an army was between two mountains occupied by the enemy and there were only two roads, he suggested that the commander should make a ditch at the rear and give the impression of forcing the army through the only road that remained open. This act could mislead the enemy who concentrates his forces on the remaining open part prepared to fight. However, if the commander threw a bridge of timber ordered to such an effect over the ditch and crossed that obstacle, he could escape the enemy.[190] In book six Machiavelli detailed the importance of information on enemy activities and plans requiring spies, ambassadors and experts of war. However, he emphasised that the enemies were also active in this field, which became manifest when one took prisoners from them to this effect.[191] In book seven Machiavelli gives 27 general

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[185] MACHIAVELLI 2003
[186] Ibid.
[187] Ibid.
[188] Ibid.
[189] Ibid.
[190] Ibid.
[191] Ibid.

rules on war, but the rules do not contain terms such as effect, effective or efficient, or refer to the importance of achieving effects on the enemy.[192]

The strategist and historian Jomini was an officer in the Napoleonic wars. His book *The Art of War* was first published in 1838, and can be seen as a synthesis of his practical military services and a thorough historical study. In chapter one he illustrated the importance and effect of wars of intervention, which were for him wars of opportunity. Regarding national wars he thought that the efficient defence of a country should rest on organised militia to limit the barbarities of war.[193] In chapter two Jomini praised the great advantage of the lance and concluded that lancers were inferior to hussars as skirmishers, but more effectual in charges. He also mentioned the Congreve rockets the effect and directions of which the Austrians could eventually regulate.[194] He acknowledged the contribution of councils of war, advising how the commander could contribute to more weight and effect of operations. Enthusiasm and military spirit were for him factors that produced the effects of passion that was temporary and the more permanent great love of the country.[195] In chapter three he concluded that converging routes were better for defence as two retreating divisions could effect a junction more quickly and may separately defeat the pursuers.[196] He also wrote that prejudice towards entrenched camps as bases of operations does not allow generals to trace the effects back to their real causes. By explaining the term *objective point* Jomini used a fictitious scenario in which the French army's task was to relieve the forts if the enemy succeeded in effecting a passage of the river and in besieging them.[197] He also emphasised the significance of a position in the rear within which divisions could collect and oppose the enemy if he becomes successful in effecting a passage. Regarding the French declaration of war in April 1792, Jomini could not understand why the French did not conquer Belgium in which there was no effectual resistance, at all.[198] The behaviour of the allies in the campaign of 1793 was for him an example of the effect that a faulty direction of operations has.[199] His maxim number ten concerning lines of communication stated that two such lines must be arranged in a way that passing armies are able to effect their junction without being separately exposed to the enemy. According to maxim number fifteen, on crossing a large river in the presence of a numerous enemy, the first consideration should be to ascertain where the passage could be most certainly affected.[200]

By examining the advantage of the central lines in case of very large masses and concentric operations, he used expressions such as *affecting a junction, the effect of suffering reverses,* and *affecting a union of two armies.* Jomini also emphasised the effects of roads on a retreat and the advancement of armies so as to affect a junction. In his epitome of strategy, he wrote that the system of rapid and continuous marches multiplies the effect of an army. This can be magnified if those marches are directed upon the

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[192] Ibid.
[193] JOMINI 1992
[194] Ibid.
[195] Ibid.
[196] Ibid.
[197] Ibid.
[198] Ibid.
[199] Ibid.
[200] Ibid.

decisive strategic points of the zone of operations.[201] In chapter four on grand tactics and battles Jomini suggested the selection of tactical position to be done in such a way that it should give the artillery all its effect in the defence.[202] In his analysis regarding offensive and defensive positions in a battle, he emphasised the importance of the moral effect that comes from movement towards enemy lines. Such an advance can only be stopped by well-placed batteries that produce the greatest effect on the approaching assailant. The moral effect of the subsequent counterattack was for him enough to stagger the boldest troops.[203] Regarding battles he wrote that force must be employed with the aim to obtain the most effective action since this offers the biggest chance for success.[204] In detailing the different orders of battle, he wrote about effecting the decisive manoeuvre and detours around the enemy's flank. A perfect order of battle was for him one that united the double advantages of the fire of arms and of the moral effect produced by an onset.[205] The retreat of the first line had for Jomini a moral effect on the second, resulting in loss of command over the troops involved. Regarding the fire of musketry, he admitted that it was much more effective in defence than in offence. In his analysis of various campaigns he used expressions such as *affecting a detour* and *the effect of discouraging the enemy.*[206] In chapter six on logistics he again used terms such as *affecting a junction* and *the effective capture of enemy soldiers.*[207] In chapter seven on the formation of troops he wrote about the greatest and most destructive effects of the artillery and the effect that comes from shock when attacking with pikes. Among others he mentioned moral effects in battle, which come from being in a column and having arms at the shoulder without firing a shot. Further references included the effect of the enemy's fire, the effect of arms improvements, the momentary effect of a cavalry charge, the effect of artillery and musketry fire, the moral effect of reverse fire upon troops and the efficiency of rocket batteries in frightening horses.[208]

No other theorist has shaped military thinking in the Western world more than Clausewitz. Although his sudden death deprived him of the opportunity to finish his work properly, even in its incomplete form, *On War* is one of the most influential and voluminous book ever written on war. The sheer volume of the book prohibits a similar display with the other authors, but it also differs in some respects. Clausewitz not only used words such as *effect, effective* and *efficient* significantly more often than the previous authors, but he also delivered a detailed analysis regarding cause-and-effect relationships and the way effects interact in war. In book one on the nature of war, he used terms such as *disproportionate effect, combined effect, moderating effect, effect of fear,* and *restrictive effect.* He also wrote about the effective way of using force and the effective forms of fighting.[209] In book two on the theory of war he referred to psychological effects, particular effect, moral effects, effects of danger and the effect of the engagement. However, what makes his work interesting is present in chapter five, in

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[201] Ibid.

[202] Ibid.

[203] Ibid.

[204] Ibid.

[205] Ibid.

[206] Ibid.

[207] Ibid.

[208] Ibid.

[209] CLAUSEWITZ 1993

which he delivered a critical analysis of causality in war. For him facts and the underlying motives were seldom fully known in wars, and the deduction of effects from their causes is difficult. Therefore, causes remain mostly unknown due to intentional concealment or improper recording. Since effects do not always come from known causes, there are always gaps in terms of causality, and ignoring this can cause serious problems. Clausewitz was convinced that effects in war cannot be traced back to a single cause, as several concurrent causes are normally at work. It is not sufficient to trace effects back to their causes, but the causes themselves must be assessed correctly. He regarded investigation of the nature of effects important otherwise the analyst faces the danger of unending arguments that lead to no conclusion. Regarding effects and their causes, it is impossible to establish laws and standards, although reliance on aids in the process of judgement can be helpful.[210]

For Clausewitz, investigating the relationship between cause and effect becomes easy only if they are closely linked. Unfortunately, in war everything is interconnected and effects produce influence all subsequent events, as for the final outcome every means available influence the ultimate outcome. When tracing effects back to their causes, every step means that effects become causes themselves. An effect that appears correct at one level can become objectionable on a higher level and imply a new basis for judgement. This hierarchical chain indicates serious problems since he regarded the distance between cause and effect proportionate to the number of other causes to be considered. Consequently, the range of forces involved and circumstances that must be taken into account grows since the higher the effect the greater the causes by which they could be achieved. In order to comprehend the intricate and difficult nature of causal relationships in war, Clausewitz advocated a critical analysis to illuminate the connections and determine essential concatenations. This analysis is even more important since people are biased and tend to blindly follow single line of thoughts. As the analysis goes towards psychological forces and effects, reliable evaluation becomes increasingly cumbersome. Regarding the will, which he defined as the interplay between courage and fear, even critical analysis cannot determine probable outcomes. Although he was aware of the difference and interrelatedness of physical and psychological effects, he emphasised that the psychological effect is of concern.[211]

In book three he insisted that a strategic theory must consider not only material factors, but also moral qualities since physical and psychological effects form an organic whole. Furthermore, he referred to the effect of the engagement, the effects of genius, the ricochet effect of forces, desired effects, destructive effects, and the effect of the advantage.[212] In books four to seven his vocabulary included a wide array of effects such as the effectiveness of additional forces, effect of surprise, effective integration of the individual parts of the army, effective sphere of operations, effective range of weapons, strategic effectiveness, effectiveness of resistance, effective strategic move, effectiveness of diversion and immediate effect.[213] In the last book concerning war plans he emphasised that so many factors influence military campaigns that the almost infinite distance between a cause and its effect reveals an endless combination of the elements involved.[214] The maximum that

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[210] Ibid.
[211] Ibid.
[212] Ibid.
[213] Ibid.
[214] Ibid.

can be achieved is to work in a comprehensive fashion to avoid narrow formulas for solving problems.[215] Commanders should rely on the capacity of their minds with actions being a response to the immediate challenge rather than a product of thought.[216] He further wrote about effective blow against the principle ally, intentional effect, maximum effect of an attack, and effective help.[217]

4.2. Interrelated Elements

All of the four selected theorists' vocabulary contain terms such as *effect, effective*, and *efficient* to various degrees. Attempts as indicated by the approaches to reinterpret the work of past theorists on effects-based principles mean that their theory and methods are used to explain present day phenomena. The result is a naive and one-dimensional misconception that disregards influential and historical circumstances of their respective age.[218] Effects-based operations rest on three common elements such as effects-focus, advanced technology and systems thinking. In this chapter these elements served as a vehicle to detect four selected theorists' relevance for effects-based operations in detail. Statements that the origins of effects-based operations lay with Sun Tzu, because he wrote that killing is not the important thing appear to be far-fetched and biased. His recommendations have validity only in their own historical context. Sun Tzu intended his advice not as a replacement for, but as an adjunct to the actual use of force. Citing him with the intention to validate present day strategic theory disregards the particular reality and the particular praxis of his age.[219] His significance is due to the fact that Sun Tzu was probably the first who understood the importance of strategy and forming strategic alliances as an alternative to bloody wars. References such as the ability to overthrow a city without throwing a rock only highlights the existence of various alternatives that have always existed to bloodshed.[220]

A vocabulary that uses the term effect and its derivatives does not indicate a certain early conceptualisation of effects-based operations. No theorist delivered better, fresher and more detailed analysis on the relationship between cause and effect than Clausewitz. However, he did not do it in an attempt to formulate any early concept of effects-based operations. As a soldier-cum-philosopher, he wanted to warn theorists that the reality of war is too multifaceted for single-minded causal explanations.[221] Despite the diversity and frequency with which he used such words, his epic volume fails to give a detailed analysis, categorisation and definition of effects. His statement of disinterest in generals who promise to win victories without any drop of blood may appear to be a blow for the proponents of effects-based operations. His cynical style of writing about the higher skill of avoiding decisive battles and reaching goals by other less violent means does not

[215] Ibid.
[216] Ibid.
[217] Ibid.
[218] BASSFORD 1994
[219] TZU 1988
[220] *Air Force Operations Concept* s. a.
[221] CLAUSEWITZ 1993

qualify him as the forerunner of the concept either. For him, war was brutality and blunder, and as he concluded: history has scattered attempts to win bloodless wars to the winds.[222]

Although both Machiavelli and Jomini can be positioned between Clausewitz and Sun Tzu, Machiavelli's vocabulary is the least effects-based. It is the best example that using the term effect does not indicate the existence of an effects-based vocabulary. In the original Italian, *effetto,* the equivalent of the English effect is mentioned only ten times, and never in an effects-based way. One probable explanation is that Machiavelli was less interested in how an army fights and more in how it is possible to establish and sustain one that fights once the fighting occurs. His argumentation relates the armed forces as much to the political aspects of war as to operational employment. In this respect, he was probably among the first theorists in the Western world who raised an issue roughly similar to the concept of defence planning. The absence of the term effect in his many rules of war reflects a clear lack of his thinking in this regard.[223] Jomini's vocabulary was much more interwoven with references to effects, although not to the same extent as that of Clausewitz's. He personally preferred chivalrous warfare to organised assassination. Unfortunately, he cannot be seen as one of the forefathers of effects-based operations since for him, this sort of warfare stood for a certain epoch, and not for a phenomenon.[224] His four maxims regarding the fundamental principles of the art of war do not contain any reference to effects. He thought in terms of massing armies and massing forces, which stand in sharp contrast to the rather balanced and delicate approach of effects-based operations focusing on massing effects.[225] The idea of throwing the masses upon the decisive point forms a recurrent pattern in his work, and clearly negates the chance of an early conceptualisation of effects-based operations. Although he knew that armies could be destroyed without pitched battles, this option was for him the succession of inconsiderable affairs.[226] He often referred to moral effect, but did not attempt to examine the way it could relate to actions and physical phenomena. Thus, using the term effect and its derivatives and thinking in an effects-based way do not mean the same. The author devotes the next scrutiny to the technological aspect of effects-based operations. No theorist put considerable emphasis on elaborating the difference that technology can make in war. Despite the millennia that lie between Sun Tzu and Clausewitz, and the centuries between Machiavelli and Jomini, weapons were operated mostly by muscle and being mounted on a horse was the fastest means of advancement. It does not come as a surprise that speed in joint operations was best understood and practiced by confederated horse riding nomads such as the Huns, Avars, Hungarians and Mongols who invaded Europe throughout the ages. Due to their mobility, they conducted brilliantly executed campaigns and as the Mongols showed, at a speed that could be repeated by European armies only five and a half centuries later on the corps level. Seven full centuries had to pass before all joint operations were conducted at a speed that even Mongol Khans would have found acceptable.[227]

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[222] Clausewitz 1993
[223] Machiavelli 2003
[224] Jomini 2003
[225] Ibid.
[226] Ibid.
[227] Perret 1993; Paret–Craig –Gilbert 1986

Another example for the missing technological aspect can be found in Machiavelli and his relationship with artillery, the first and foremost military technological innovation of that age. Due to their size and weight, cannons were very hard to use in the beginning and were regarded as extremely unreliable, inaccurate and risky. However, they heralded the end of primeval warfare and paved the way for the wars to come. For Machiavelli artillery was useless, and could be overcome by ancient modes and ancient virtue. Jomini himself did not regard technology as a significant aspect of war either. According to him superiority of armament could increase the chances of success, but it does not gain battles in itself. It is just one, albeit a great element of success. Although he was aware of the numerous technological improvements that took place during his lifetime and made war more destructive, he saw their effects basically to force troops to prefer shallower formations. Similarly to Jomini, Clausewitz did not regard the technological aspect of war, manifested in weapons and equipment, as important. For him, they were not essential to the very concept of fighting. He thought that the act of fighting would determine the weapons employed. The range and effectiveness of firearms were only of tactical importance. He saw the relevance of new technologies mostly in their psychological impact on the enemy, but not as enablers of joint operations. As he concluded, armies of his age were very similar in weapons, training, and equipment. Consequently, he saw little difference between the best and the worst armies.[228]

It appears that the military lessons of past ages were not significantly influenced by changing technological conditions until the second half of the 19th century. Although the disparity between methods and weapons used became clear as early as the Crimean and American Civil Wars, it was only World War I that displayed the immense gap. Weapons of industrial mass production with an ever-increasing destructive potential shattered the value of past military experience only in the 20th century. Regarding the technological aspect of effects-based operations, none of the four theorists can be regarded as originators of the concept since they did not regard technology as leverage. Regarding systems thinking, more similarities can be detected with effects-based operations. For Sun Tzu, the way of battle was measured by five things such as the way, weather, terrain, leadership and discipline. Way stood for inducing the same aim in order to share death and life without the fear of danger. Weather meant the four seasons, terrain referred to distance, difficulty, dimension and safety. Leadership was composed of intelligence, trustworthiness, humaneness, courage and sternness. Discipline stood for organisation, chain of command and logistics.[229] Machiavelli did not provide such an explicit categorisation, but the sequence of his books might reveal some sort of systematisation. Book one describes the qualities needed for war and discusses the role of fortune and virtue. Whereas book two details initial armament and unit organization, book three addresses battles, formations and describes the value of artillery at length. In book four he describes the role of the environment and addresses strategies of movement together with the psychological condition of troops. Book five details marching orders, communication, and ambushes. Book six contains encampments and intelligence, but pays special attention also to health, medicine, and supply lines. Book seven discusses fortifications in detail. Jomini's categorisation of the art of war aims basically at manifesting five military branches such as strategy, grand tactics, logistics, engineering,

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[228] MACHIAVELLI 2003; PARET–CRAIG–GILBERT 1986; JOMINI 2003; CLAUSEWITZ 1993
[229] TZU 1988

tactics, and discipline, and one civilian branch called diplomacy. Strategy equalled war made on the map, with the aim to direct masses properly in the theatre of war. Grand tactics was the positioning of troops in order to bring them into the action to fight. Whereas logistics was the art of moving armies comprising means and arrangements, engineering meant the art of attacking or defending fortifications. Tactics mainly described the actual fighting, including actions such as charges, repulsions and positioning troops. Diplomacy meant statesmanship and its relationship to war efforts. For Clausewitz, a systemic approach might have been the subdivision of war into his famous paradoxical trinity, the people with a creative spirit unleashed and free to roam, the military standing for subordination as an instrument of policy, and the government that makes war subject to reason alone.[230]

Thus, concerning the aspect of systems thinking it can be said that at least three of the authors wanted to grasp the essence of war in systemic terms. Claims that throughout history effects-base operations have always been applied by talented commanders are, at least, only partly true. The works of the four theorists have at best an indirect relationship with effects-based operations, but cannot serve as origins of the concept. Referring to past theories and making forced links to support present day strategic thought is appealing. It provides useful tools to validate one's own arguments with reference to the classics, and offers better prospect and stronger arguments for selling ideas in order to gain influence. However, any such reference can jeopardise a well-founded understanding of the message and the theoretical implications of effects-based operations. It prohibits the decoding of unique historical conditions and detaches theory from practical relevance. Instead of seeing both the theoretical forest and the contextual trees it offers only theoretical trees and a contextual forest, which is superficial, misleading and extremely dangerous.[231] A carriage pulled by a horse, and a car driven by a combustion engine reveal obvious similarities, but do not indicate that those who invented the carriage also had the car in mind. If one understands war and effects-based operations in a social context, then specific factors and conditions must be assumed. For Clausewitz it was clear that every age had its own kind of war with its own limiting conditions, and peculiar preconceptions. Each period would have held to its own theory of war, even if the urge had always and universally existed to work things out on scientific principles. It logically follows that events of every age must be judged in the light of its own peculiarities.[232] Following his advice the only conclusion left is that the origins of effects-based operations must lie much closer to present days. In reality, the reason why effects-based operations came into being was the scarcity of available aerial resources during the 1991 war against Iraq. As Gen. Deptula stated during an interview the concept grew out of the practical problem of how to compensate for this shortcoming. The unexpected success of the approach and the power of advanced technology resulted that effects-based operations became the philosophy the Americans used in targeting for the rest of the war planning effort and then during the war.[233]

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[230] JOMINI 2003; CLAUSEWITZ 1993
[231] LEE–WALLING 2003
[232] CLAUSEWITZ 1993
[233] *Air Force Operations Concept* s. a.

4.3. Military Coercion

Ideas and theories, on how to conduct operations properly, of most air-power theorists reveal striking similarities with the three common elements of effects-based operations. Aimed at certain vulnerable elements of the enemy the intention was to find means to achieve victory less through the application of brute force in the physical domain, but more through various coercive mechanisms aimed at influencing the psychological domain. The focus on influence and psychological effects came as a result of a powerful technological innovation of the early 20th century, the airplane. Air power theories similarly to the concept of effects-based operations have advocated various mechanisms of military coercion to achieve effects on the enemy. The assumption has always been that advanced technology in the form of the airplane and various sorts of bombs make it possible to go directly to the heart of the enemy thus making war less bloody and costly in term of resources involved. The underlying assumption has been that technological developments and a systemic top-down strategic approach make possible to achieve effects directly on enemy vulnerabilities.[234]

Major wars of the 20th century disproved much of air power theorists' assumptions. World War II was extremely destructive and as time passed the focus increasingly shifted towards the physical domain. Achieving higher order psychological effects became of secondary importance. Massed firepower and large-scale destruction were regarded as decisive factors and reflected the tendency among the nations involved to employ force beyond reason.[235]
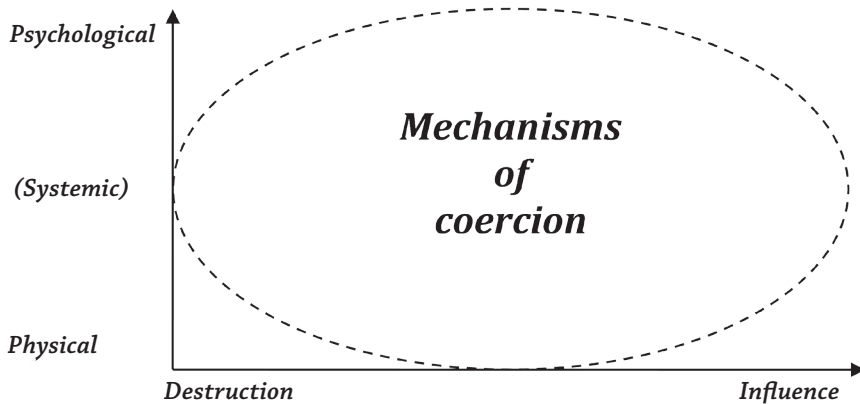

Figure 6.
Continuum of joint operations

Source: Drawn by the author

The seven approaches to effects-based operations made it clear that the concept focuses on control instead of destruction. The clear relationship with military coercion theories is obvious as the aim of both is the sources, and not manifestations of power. [236] In the area in

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[234] COOPER 2001
[235] BOYD 1986; WIJK 2005
[236] MEILINGER 2003; PARET–CRAIG–GILBERT 1986

which air power theories and theories of military coercion overlap technological developments and practical considerations have often played greater roles than ideas with real-world relevance. An examination of this overlap reveals that not only does the vocabulary used differ from one theorist to the other, but the same term can refer to different things for the same author at different times.[237] A thorough examination of air power theories advocating various coercive mechanisms can explain the preference for control and shed light on the fundamental differences between destruction and influence. This is even more important as destruction and influence mark the two end poles on the horizontal axis of the theoretical framework proposed earlier and depicted in Figure 6. Among scholars there is a general consensus that there are four different schools of military coercion theories. Each school stands for one mechanism and can be described as punishment, risk, decapitation and denial.[238] In the framework of this book it is impossible to detail all the ideas that have contributed to the literature of military coercion, but the introduction of well-known representatives from respective schools can help understand underlying assumptions. The following comparative analysis aims at identifying the types of effects the respective schools stand for, the technology that made the theories possible and the extent to which these theories reflect a systemic approach. These four schools of thought will be confronted with battlefield realities in order to examine to what extent they have worked in reality.[239] Limitations in terms of means applied together with the focus on desired psychological effects support the assumption to regard effects-based operations as a coercive concept. Gen. Deptula, an advocate of the concept introduced earlier, stated that he would once like to see sets of integrated physical and cognitive effects models that help achieve national security objectives in a non-kinetic fashion without the enemy even knowing that he's been influenced.[240]

4.4. Theory Behind

Military coercion theories are built on the assumption that a limited application of well-proportioned force can be sufficient in itself to make the enemy comply, thus resulting in lower costs in terms of man and money. Military coercion stands for convincing and not forcing the enemy to concede by precluding any physical alternative. It is a form of explicit power that does not rely on the direct and exclusive application of force, but emphasises reasoning and the persuasion of the enemy in order to change behaviour. Due to its attractiveness, coercion is often perceived as a quick and cheap solution to complex international problems. Coercion has also a strong economic focus as globalisation made the relationship of the nations so closely interwoven and interdependent that destruction of the other often recoils on the head of the victor.[241] Technological and political aspects of the third wave and the increasingly asymmetric character of joint operations make military coercion very attractive for politicians. Whereas the technological aspects enforce the interest in it, the political

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[237] PARET–CRAIG–GILBERT 1986
[238] PAPE 1992
[239] MUELLER 1998; PAPE 1992; PAPE 1996
[240] HENNINGSEN 2002.
[241] SIMPSON 1994; MUELLER 1998; PAPE 1996; LIDDELL HART 1925

aspects enable it. Increasing globalisation and interconnectedness also mean that any attempt to fight purely destructive wars is neither clean nor heroic. It is just purposeless.[242]

Military coercion aims at influencing the enemy's behaviour by manipulating his cost-and-benefit calculations with the aim to achieve the same political goals as with brute force, but with the involvement of fewer resources. It is an attempt to achieve victory on the cheap in which the coercers often tend to overestimate the prospects of military coercion and underestimate the costs involved.[243] As an alternative to unlimited destruction, military coercion emphasises that confrontations can be better settled through the selective application of force aimed at modifying enemy behaviour. Although the emphasis on influence over destruction does not exclude the application of force, combined with alternatively negotiated solutions, military coercion tries to avoid the escalation of violence. The genesis of modern military coercion theories emphasising the need for jointness this sort or the other in military operations dates back to World War I and the carnage encountered in the trenches. After the war many were convinced that further wars of this kind would mean the demise of Western civilization and regarded it as a great waste of resources that exhausts both the victor and the vanquished.[244] Theorists started to search for new approaches and questioned the need to confront large forces based on attrition and annihilation. Instead of applying brute force to make the enemy comply, theorists started to focus on quicker and cheaper mechanisms deemphasising destruction. Their efforts aimed at exploiting the difference between coercion and brute force that is manifest in getting what someone can take by force or make the other give it voluntarily in order to avoid risk or damage. Military coercion does not exclude the involvement of force, but it is applied in a limited way to induce changes in enemy behaviour. It requires intimidation to make the enemy realise that it is his decision to fight and eventually die or to surrender and live.[245]
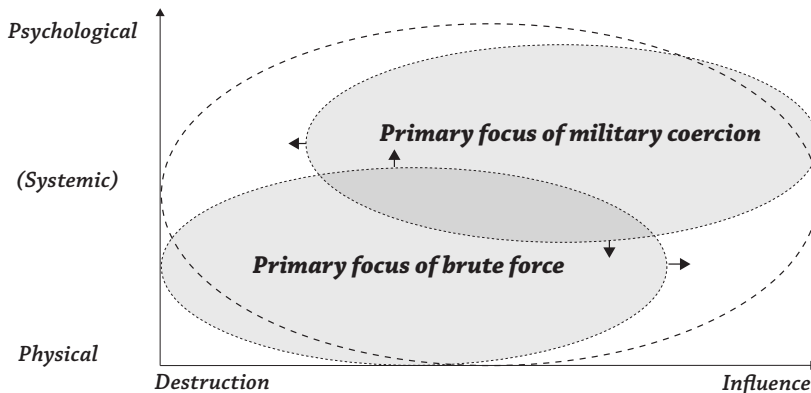

Figure 7.

Focuses of brute force and coercion

Source: Drawn by the author

[242] Schelling 1976; Cimbala 1998
[243] Pape 1996
[244] Liddell Hart 1925; Liddell Hart 1967; Douhet 1983
[245] Schelling 1997; Crowder s. a.

The prospect offered by coercive mechanisms in operations was persuasive to drive the search for better and more humane applications of force. There is, in fact, a striking difference in terms of mechanism between brute force and military coercion. Whereas the former aims at complete destruction of the enemy's capabilities to resist, the latter seeks to persuade the enemy prior to military defeat. Brute force rests on attrition and annihilation and comes as the result of unlimited aim and unlimited method. The focus is on wearing down the enemy to the extent he no longer possesses an organised force. Brute force results in physical defeat that comes as the result of direct, unconditional actions eliminating the enemy's ability to do anything other than comply. Military coercion accepts that the enemy might have a certain capacity to command his forces, but he is offered the chance of mitigation and solving challenges short of major war.[246] As Figure 7 depicts, similar to effects-based operations the primary focus on psychological effects places military coercion in the upper right area of the continuum of war. The psychological focus is driven by the assumption that it is less expensive to convince the enemy to surrender than to make his resistance physically impossible. Military coercion stands for camouflaged war. It is based mainly on political manoeuvres in the diplomatic field that can transition into joint operations if necessary.[247] One can say that whereas brute force is aimed at the enemy's physical capabilities, military coercion rests on the exploitation of potential violence to influence the enemy's behaviour. In case the enemy does not comply, force is applied in the form of limited military actions to persuade.[248] Military coercion regards fighting power as a flexible tool that helps achieve psychological effects. Brute force sees fighting power as a blunt instrument to achieve an end-state regardless of enemy behaviour. Similar to the assumptions of effects-based operations military coercion stands for a more gradual, adequate and sophisticated response involving a broader range of means.[249]

4.5. Multiple Meanings

Coercion in general can be defined as the use of threatened force including the limited use of actual force to back up the threat and to induce an adversary to behave differently than it otherwise would.[250] In normal English usage coercion has many meanings that are synonymous with force. Whereas meaning one a) says that it is an act, which includes the use of both physical and moral force to compel to act or assent, b) states that it is a power or force that coerces. According to meaning two, coercion is the application of sanctions in order to compel dissenters to conform. Meaning three c) emphasises it as a physical force tending to constrict or compress. Meaning one of the verb to coerce indicates restraint, control or domination; meaning two defines it as to compel an act or choice by force, threat or other pressure. Definition three is the most general and stands for effecting, bringing about, establishing or enforcing by force, threat or other pressure.[251] Both verb and noun

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[246] LIDDELL HART 1925; LIDDELL HART 1946; PAPE 1996; JOHNSON–MUELLER–TAFT 2003
[247] JOHNSON–MUELLER–TAFT 2003; LIDDELL HART 1946
[248] SCHELLING 1976; CIMBALA 1998
[249] GEORGE–SIMMONS 1994; RHODES 1989; LIDDELL HART 1967; LIDDELL HART 1925
[250] BYMAN–WAXMAN–LARSON 1999
[251] GOVE 1981

stand for an outside influence that includes the possible application of force or a forceful act. Coercion thus can be seen both as an act and a form of power. It is a kind of control subset to some types of exercises that reveal a power relationship with two universally recognised and intrinsic elements, such as the players and their actions. Terms such as coercive internationalism refer to this power relationship by taking incompatibilities between states for granted. It aims at abstaining governments with colliding interests from escalation and war.[252] Coercion in its purest form must not include the actual use of physical force since the power relationship includes all means of influencing behaviour through the threat of harm. Thus coercion is a two-sided activity in which the enemy is forced to perform or is restrained from performing a certain act. In both cases actions and their consequences are detached from his desire as he is not able to choose freely, but only to comply or risk a penalty. The enemy can choose only from a restricted set of alternatives since his will is subjected to that of the coercer. In this sense, coercion is a particular way of bringing the enemy to perform an action under threat.[253] Threat coerces more than the reality of actions in which the coercer's capabilities might matter less than what the enemy thinks the coercer can do with them. Coercion takes the perception of threat for granted and requires a communication of incentives about the automatic consequences. Threat indicates the involvement of overt actions and not intentions with the assumption that one asserts that he will do in contingency what he would manifestly prefer not to do if the contingency occurred as it is governed by the other's behaviour.[254] Although threat plays an important role in coercion it is only a substantial, but not sufficient element. Sufficient coercion depends on the nature of the act, the character of the harm involved, and the circumstances framing that threat. Threat can never occur in a vacuum since it is not intrinsically or inevitably coercive. It can become insufficient either because it is simply not severe enough to achieve its purpose or not sufficiently severe to leave the opponent with only one reasonable choice. Whereas the first is insufficiency in relation to the opponent and circumstance, the second is insufficiency in relation to the act.[255]

   Threat indicates that the enemy acts in the only reasonable, but not necessarily in the only possible way. Threat must also be sufficiently serious to compel the enemy into acquiescence. He must be threatened with a penalty that is severe enough to justify him in submitting. Coercion is forcing the enemy to choose one option over another by making one more attractive. It is a message about what the enemy should do with the difference in possible consequences. Threat alters the attractiveness of options available with the prospect of both a negative and a positive sanction. Coercing the enemy requires coercive power in order to achieve a desired outcome by influencing his behaviour. Coercive power rests on a contingent strategy, credibility and commitment. Unfortunately, coercion cannot always be successful since the enemy is either rational and thinks that suffering the imposed unpleasantness is still more attractive than yielding or he is irrational and insensitive towards the sanctions imposed. Coercion is context dependent and only successful if it goes with the ability to alter key components in the enemy's decision calculus to compel concessions.[256]

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[252] ROSENBAUM 1986; GOLDMANN 1994
[253] HOEKEMA 1985
[254] MUELLER 1998; JERVIS–LEBOW–STEIN 1985; SCHELLING 1997
[255] HOEKEMA 1985; MORGENBESSER–SUPPES–WHITE 1969
[256] HOEKEMA 1985; RHODES 1989; PAPE 1996

Context dependency indicates coercion to be simple in theory, but complex in practice. A rough subdivision of coercion into two broad categories such as deterrence and compellence might be helpful to turn coercion theory into practice.[257] Both rest on mechanisms that manipulate the enemy's decision-making calculus either by the threat of force or its limited application. They are intimately linked since deterrence refers to something the opponent already does and includes some aspects of a compellent threat. Whereas in compellence, the enemy is promised some reward if he yields, in deterrence he faces a certain threat of pain if he does not.[258] A further differentiation can be based on whether the enemy must merely refrain from acting and must stop doing an ongoing activity or start a desired one. Deterrence and compellence reflect the difference between a threat that is intended to make the enemy do something and a threat intended to keep him from starting something. The distinction is based on timing and initiative.[259] Thus deterrence is rather passive whereas compellence is more active. The former is a static action and means setting the stage and waiting. The latter is dynamic and stands for initiating an action or gaining momentum to make the opponent act. Regarding timing, deterrence is rather indefinite, but compellence is more definite, since too little time makes it impossible and too much unnecessary. Assurances accompanying compellent actions are also difficult to demonstrate in advance, but in deterrence the need for assurances emerges as an integral part. Deterrence is something like a defence, and compellence is more like an offence, but as soon as the confrontation starts the difference may vanish as coercion includes both. Whereas in deterrence there is a connection between the proscribed action and threatened response; in compellence the connection is less defined or does not exist as compellent mechanisms usually depend on threat and demand. Deterrence is more future-oriented since a threatening act intended to dissuade the opponent from undertaking an action is not yet initiated. Compellence seems to be more cumbersome in this regard as it does not offer a distinction between the defensive and offensive aspects of coercive threats. Compellence simply does not leave space for other aspects, such as rational persuasion and accommodation.[260]

In terms of future aspects deterrence may include promises of rewards for complying with the coercer's demands. Complying with one's demands might be more attractive and has the same effect as making defiance less attractive. Deterrence is convincing the enemy not to take an action by making the expected benefit appear worse than the consequences of not acting. It involves preventing the opponent from an action that has not yet materialised. The point is that in deterrence nothing happens until the enemy acts contrary to our demand. Deterrence seeks to discourage the opponent by altering his behaviour and influencing his calculus for decision-making. Deterrence is a preventive approach to avoid certain outcomes rather than an approach aimed at bending the enemy to our will. Compellence is more active and better recognisable under duress. The difference between the two is similar to that of inducing inaction or making the enemy perform. Compellence involves attempts to reverse an action that has already occurred in order to overturn the status quo.[261]

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[257] Byman–Waxman–Larson 1999; Wijk 2005, 85–121; Johnson–Mueller–Taft 2003; Freedman 1998
[258] Byman–Waxman 2002; Pape 1996; Schelling 1976; Rhodes 1989; Wijk 2005
[259] Treverton 2000; Schelling 1976; Freedman 1998
[260] Schelling 1976; George–Simmons 1994
[261] Johnson–Mueller–Taft 2003; Byman–Waxman 2002; Schelling 1997; Pape 1996; Snyder 1999; Schelling 1976; Byman–Waxman–Larson 1999

Compellence also means causing an action favourable to own demands as successful threats do not have to be carried out, but violence may be used in order to influence the enemy's perception. Compellence appears to be more risky since the initiative is ceded to the enemy who can decide upon the duration and cost of resistance. In general, compellence tends to be more difficult than deterrence. It is harder to force the enemy to reverse an action, than to not carry it out. Threat in compellence can take the form of administering the punishment until the enemy acts, and not if he acts. Success in compellence depends on the connection between threat and demand that can range from physical to psychological.[262]

Although compellence is more difficult than deterrence, many deterrence situations can turn out to be cases of compellence. Compellence involves persuading the enemy to stop an ongoing action or to start a new course of action by changing his calculations regarding costs and benefits. In terms of the threatened sanctions, compellence seems to be more complex than deterrence although both share the vocabulary of threat and imply punishment in some form. The spectrum of coercion is characterised by compellence and deterrence, which indicates a huge bandwidth for possible coercive mechanisms. Successful military coercion means understanding the basic logic of actions and the sensitivities of the enemy. This must go together with a careful selection of proper mechanisms in order to affect those sensitivities and the way they change over time.[263]

[262] SCHELLING 1997
[263] SNYDER 1999; PAPE 1996; FREEDMAN 1998; PAPE 1992

5. Coercion and Effects

Based on writings during the Cold War, the literature of military coercion is dominated by deterrence. During that period, deterrence was seen as the main business and compellence the exception. This preoccupation has distorted the concept of coercion and often does not apply to the circumstances political and military decision-makers face.[264] Nevertheless, the two categories and the four schools of military coercion each describing one mechanism serves as a solid background for examining the similarities between the concept of effects-based operations and that of military coercion as both advocate the necessity of joint operations. The first and earliest school of military coercion that will be detailed is punishment. It can be seen as a reaction to the brutality of trench warfare during World War I. As a reaction to it, strategists everywhere wanted to answer the question of how wars could be waged more cleanly, more decisively, more intelligently, and as humanly and civilised as possible. The early theorists of military coercion believed in technological developments and saw in the airplane the revolutionary instrument that offered alternative means to the futility and immobility of trench warfare. Punishment stands for the application of air power against population centres in order to achieve a quick inside-out collapse of the enemy. Punishing civilians for supporting war efforts was regarded as a better mechanism for achieving victory than being dragged into static military engagements based on attrition and annihilation.[265] The major theorists of this school are Douhet, Mitchell, members of the Air Corps Tactical School (ACTS) and de Seversky. In respect to the second school of military coercion called risk, Brodie and Schelling will be introduced.

5.1. Aerial Threat

Strategists of the inter-war period searched for ultimate means with maximum leverage in order to shorten time and save resources needed for the conduct of operations. Their efforts were based in the context of total war between modern industrialised nation-states and focused on reducing war sustainment capabilities by affecting enemy population. Their theories reflected a mechanical image of war in which victory would go to the nation with the greatest industrial resource. They assumed that the entire population together with all national resources would be required to wage war successfully as wars would be total in character and scope. They wanted to avoid excessive bloodshed on the battlefield and instinctively sensed that the coming era would stand for a new age. They saw war in technological terms. Industrial mass production, increasing mechanisation, and the combustion engine made them assume that future wars would be a matter of material and machinery.[266]

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[264] SCHELLING 1976; WIJK 2002; WIJK 2005; FREEDMAN 1998
[265] SNYDER 1999; FABER 1996–1997
[266] LIDDELL HART 1925; DOUHET 1983; BASSFORD 1994; SLESSOR 1936; EMME 1959

They uncritically believed in the supremacy of the recently introduced aerial weapon and stated that applied independently it could destroy any target on its own. These theorists were confident that air power could produce the speedy moral collapse of the enemy that comes as a result of quick and decisive effects. In World War I the trenches demonstrated clear limitations of surface forces. The airplane was seen as a sort of advanced technology and regarded as a superior alternative. These early theorists are all punishment-oriented since they did not make a difference between military and non-military objectives. As a result governments everywhere assumed the worst and starting with the 1930s the heavy shadow of bombers hung over the cities throughout Europe.[267] The mechanism inherent in punishment targets the enemy nation's will to resist by making life so unpleasant and difficult that people would rise up and prefer to comply with the terms of surrender, rather than to endure the imposed misery. Later punishment was not limited to hitting the population and referred to the killing of military personnel in large numbers in order to exploit casualty sensitivity of the enemy. Either way the aim was to increase costs of suffering that a society has to pay should it continue with the resistance. Punishment stood for relentless bombing of civilian centres or damaging the enemy's economy in order to cause shortages in key supplies and services.[268] The Italian military thinker Giulio Douhet was the first among air-power theorists who advocated the superior quality of the airplane. He regarded the air as a battlefield and lobbied for air power's independent application as any auxiliary role was for him conceptually illogical. Victory in war depended on the technical means applied from which air power and the application of poison gases were the most significant. War was for Douhet a conflict between two opposing wills in which air power was able to fly far behind fortified lines to make its effect felt deep in the enemy country. The application of airplanes meant that all enemy citizens could be exposed to offensives from the air since air power does not differentiate between soldiers and civilians. Thus there was no effective defence against determined efforts aimed at bombing cities.[269] Douhet proposed offensive actions to achieve victory, for which air power was an excellent weapon due to its ability to magnify the advantages of the offensive and minimize or even nullify the advantages of the defensive.[270]

Douhet opposed Clausewitz for whom defence was the stronger form of combat. The guiding principle for bombing was based on complete destruction in one attack in order to achieve moral and material effects the repercussion of which would become tremendous. Since Douhet did not differentiate between military and non-military objectives, he suggested targeting industrial and commercial establishments, important private and public buildings, transportation infrastructure, and centres of civilian population. For bombs he advocated a mix consisting of explosives, incendiaries and poison gases that should be dropped as uniformly as possible over a given area. He also advocated aerial offensives both against objectives of least physical resistance and against those of least moral resistance.[271] He regarded offensive aerial actions so devastating that the enemy's physical and moral resistance would collapse. Command of the air meant for Douhet victory based on

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[267] LIDDELL HART 1967; DOUHET 1983; OVERY 1981; BUDIANSKY 2003; EARLE 1943
[268] PAPE 1996
[269] DOUHET 1983
[270] Ibid.
[271] CLAUSEWITZ 1993; DOUHET 1983

mathematical certainty. He proposed striking the enemy by air power in the air, at bases of operations and at production centres. For him excluding the army and navy meant achieving swift and crushing victory on the battlefield with least casualty and a minimum of means involved.[272] Regarding an independent air force, he differentiated between two functions such as units of bombardment and units of combat. Units of bombardment had to possess sufficient striking power to achieve significant results by destroying the target completely. For one unit of bombardment he proposed ten planes that made attacks more effective and painful, and paralyzed all human activity. Units of combat had the task of clearing out aerial opposition that may cross the path of bombers in a mission.[273] He wanted to achieve effects on the enemy through aerial offensives concentrated in time and space. Douhet did not propose any rules regarding the choice of enemy targets, but saw target selection as the most delicate aspect of aerial warfare. Target selection depended for him upon a number of circumstances including material, moral, psychological, and other factors the importance of which cannot be easily estimated. His aim was to smash the material and moral resources of the enemy until all social organizations collapsed. Despite the horror of such warfare he assumed that it might involve less bloodshed in the long run.[274]

In order to attain maximum effectiveness, he regarded the thorough co-ordination of land, naval and aerial forces as paramount. War was for him fought in masses composed of men and machines in which an independent air force must attain two strategic goals. First achieving command of the air and then crushing the moral and material resistance of the enemy. The key elements of his theory were the destruction of the enemy air force on the ground, achieving air supremacy and taking war directly to the heart of the enemy. Thus air power was the ultimate strategic weapon and strategy defined by its destructive potential.[275] The American proponent of air warfare William "Billy" Mitchell saw the aeronautical era of mankind approaching, which would subjugate the atmosphere. As he wrote, the arrival of the aircraft can set aside all ideas of frontiers as one place becomes just as exposed to attack as any other place.[276] He built on Douhet's ideas and emphasised the use of explosive bombs and poison gas in order to make the enemy evacuate his population centres and cease industrial production. Unlike Douhet he thought that with the rapidity of technological advances only the threat of aerial bombing would be sufficient to achieve victory. He pledged the importance of achieving air supremacy that enables airplanes to fly over the enemy's territory at will. He also believed that aerial bombardments could make wars not only much sharper, but also more decisive and shorter. Mitchell did not see the people as important targets, but rather the centres of production such as means of transportation, agricultural areas, ports and shipping that cannot be replaced during the war.[277]

Victory depended on the amount of air power produced and applied as aerial bombardments were for him the most accurate method of hurling missiles.[278] Air power has a decisive impact on the enemy's capability and will to fight since air battles would be of so

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[272] Douhet 1983; Hallion 1997
[273] Douhet 1983
[274] Ibid.
[275] Ibid; Snyder 1999
[276] Mitchell 1925; Mitchell 1975
[277] Mitchell 1925
[278] Ibid.

far reaching effect that the nation losing them could do nothing, but to capitulate without resorting to further contest. He regarded air power as a punitive element of the first order that could fly straight to the heart of the enemy country and destroy its capacity to make war in an incredibly short time. Air power made it possible for him to attack any human population centre ranging from large cites down to a simple hamlet. Once control of the air was established its effect was terrific, cumulative and constantly becoming greater. He envisioned the air force as an independent service established to attain victory first in the air and then to destroy enemy establishments on the ground. He advocated a mixed air force composed of fighter, pursuit and bomber airplanes that possessed the ability for both offensive and defensive applications. Air power was for him a strategic weapon, but not the ultimate one.[279] Mitchell envisioned the enemy country as an integrated and mutually supporting system, susceptible to sudden destruction and laid the foundation of the industrial web theory. In order to exploit the air fully, he suggested employing the air force on the strategic level aimed at achieving strategic level effects. He also proposed destroying the enemy's war-making capability and questioned the need to defeat his army in the field. According to Mitchell the airplane was able to fly directly to the enemy's heart to paralyse any form of resistance. Faculty members of the ACTS took Mitchell's ideas further. They assumed that the delicate balance of interdependent segments within national structures could be offset by air power in order to break civilian moral. Their assumption was that through the destruction of selected targets it would become possible to disrupt the enemy's economy that discommodes his population in its daily existence, and breaks its faith in the military establishment. Applying pressure to certain vital links and nodes can create an imbalance that leads to the collapse of enemy morale and paralyses economic factors essential for waging war. This assumption received a considerable boost with the introduction of the then-superior B–17 and the advanced Norden Mark XV bombsight equipment despite the fact that the effect they might produce had yet to be determined. The basic assumption was that victory in war comes as a result of disrupting national life quickly and efficiently. The enemy nation was regarded as an interlaced web and it was assumed that dislocations would produce disturbances since industrial capacities are neither separated nor disconnected.[280]

This systemic approach regarded nation-states as interconnected economic systems with detectable critical points. It was thought that the destruction of these points through high-altitude precision bombing could achieve strategic effects.[281] Attacking those vulnerable elements called bottlenecks reveals the greatest cumulative effect on the enemy's economic structure. In order to destroy the right elements, they proposed that intelligence should not only be in the realm of sheer military activity, but must rest on the collaboration of economists, statisticians, and other area experts. This approach was based on indirect attacks on the enemy through his economy with the assumption that attacking economic facilities leads to victory through disorganisation and dislocation. Identifying and disabling such facilities within the economy is critical in weakening the enemy's collective will. Although nations differ both in vulnerability and structure it was thought that a thorough

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[279] Ibid; SNYDER 1999
[280] MEILINGER 2001; PERRET 1993; WEST 1999; FINNEY 1955
[281] BELOTE 1999

analysis could reveal those critical elements that support the enemy's will to resist. For such theorists, air power could be applied as a force that can efficiently solve policy disputes on its own through daylight offensive precision bombardments. This emphasis on daylight precision bombardments requiring no fighter escort achieved a dogma-like status and was not abandoned until the clear demonstration of its failure in 1943.[282] Members of the ACTS believed in the ability of air power to break down the enemy's will and capability to fight, either by destroying the web of organic industrial systems in the enemy's interior or by paralysing organic industrial, economic and civic activities. Whereas the first was responsible for the armed forces in the field, the second provided for the existence of the enemy nation. Air power was seen as able to destroy those critical systems that were crucial to other industrial branches and the population for whom it produced and distributed electricity, fuel, food, and steel. Thus air power could destroy networks of transportation, specialised factories that produced electrical generators, transformers and engines.[283]

A small amount of carefully concentrated destruction of critical nodes was assumed to be enough to cause the fragile economic system of the enemy to collapse. This paralysis could shatter the will of the people so much that they would stop fighting and force the government to surrender.[284] For the American strategist Alexander de Seversky aviation was a paramount and decisive factor in war-making. As a swift and destructive weapon it also influenced tactics and strategy. He regarded air power a dynamic and expanding force that spoke a strategic language that required the capability to out-build, out-think and out-plan any potential enemy. Similarly to the members of ACTS, air power was for him a weapon that could strike at the enemy nation's nerve centres and jugular veins. He believed that a total war from the air was possible and that such a war did not proceed piecemeal since the whole enemy country was regarded as a target. For him war was no longer seen focused on occupation, but destruction that should be systematic and scientific. Instead of being dragged into a mutual slaughter of soldiers, genuine air power could make the short cut that comes as a result of an all-out aerial assault on the enemy. Air power indicated to him that mankind arrived at the age of tri-dimensional warfare in which air dominance provides for a solid and impregnable roof.[285] De Seversky saw in aviation the new weapon that altered the principles of war and by opening a new and vast sphere of conquest it became the key to modern strategy. He dismissed the idea that air power alone could not achieve definitive victory over an enemy. He firmly believed that a nation could be forced to surrender from the air alone for which he suggested the following prerequisites. There must be sufficient combat power to eliminate and neutralize enemy air power, correct and intelligent choice of vital targets against industrial centres, especially those of the aviation industry. This requires adequate bombing power mostly expressed in load-carrying capacity and commitment in the form of continuity of action and endurance of effort.[286]

For de Seversky, the advent of aerial warfare widened the choice of methods since it either reinforces the traditional patterns of war such as invasion and occupation or strikes at the enemy as a totality. This way the enemy's entire war potential could be disarmed

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[282] West 1999; Perry 1999; Slessor 1956
[283] Belote 1999
[284] Pape 1996
[285] Seversky 1942
[286] Ibid.

directly and reduced to a helpless mass without the need for an invasion and mile-by-mile conquest. Although he differentiated between war of possession and war of elimination air power meant more efficiency in both. Whereas large-scale demolition carried out by army units would look like horrifying vandalism aerial bombing would be seen as a kind of technical preparation or softening.[287] Air power brought some new principles into the science of war-making. Any kind of operation requires control of the air, and an umbrella provided by air power is the minimal condition in any surface warfare. Furthermore, he claimed that only precision bombing aimed at planned and predetermined military and public facilities could destroy enemy morale from the air. Aerial blockades that systematically wreck the implements and channels of normal life could break down both the enemy's will and ability to fight. For de Seversky aviation was the first and foremost firearms of the 20th century and deserved a prime position in modern warfare.[288] Punishment as school of military coercion rested on the assumption that by bombing the population as a homogenous passive mass it would revolt against the government and demand surrender. As depicted in Figure 8 the primary effect sought was psychological assuming that victory would lie with whichever side first gains the moral objective manifest in psychological effects.[289] The mechanism aimed either at achieving psychological effects directly through the use of area weapons such as incendiary bombs and poison gases or indirectly through shortages caused in basic public services. Air power was regarded as a psychological tool and the idea of aerial warfare slowly became an all-encompassing credo possessing decisive and transformative power. Loose ideas turned into dogma as numerous publications detailed how to achieve victory through psychological effects aimed at changing behaviour.[290]
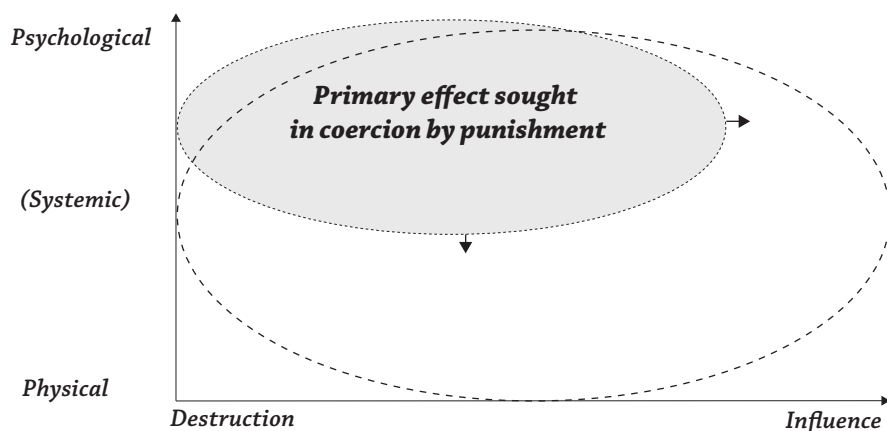

Figure 8.
Primary effect sought in punishment

Source: Drawn by the author

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[287] Ibid.
[288] Ibid.
[289] LIDDELL HART 1925
[290] BUDIANSKY 2003

This focus on higher order effects explains why the theorists never really quailed at the notion of the mass killing of civilians. As a logical consequence bombings delivered no escape from the horrors of the trenches of World War I. Not for the soldiers who flew the planes in the air and much less for the civilians who experienced the bombs on the ground below.[291] Punishment can be considered as an attempt to make war fit a mechanism, instead of developing a mechanism that fits the characteristics of war. A constant over-estimation of the capability of air power contributed to didactic and rationalist strategies based on unilateral actions with standards and methods applicable to all wars. Minimum attention was paid to the context since the assumption that maximum force always results in maximum effects was never questioned. One explanation for this bias is that there was simply no proven knowledge regarding aerial warfare at that time. Plans for employing air power and assumptions regarding their probable strategic effect had no practical experience of what the bomber really can and cannot do in modern wars. Achieving psychological effects was always the equivalent of hitting morale. In the end punishment theories failed because threats to inflict harm on civilian populations by conventional bombing have never forced anybody to abandon its goals.[292]

     The consequence of punishment in World War II was that there was no difference between the home front and the war front. The reality of war became a first-hand experience both for civilians and soldiers alike. Large-scale bombing campaigns of the 20th century showed that the morale of any given society can be quite resilient even under the harshest consequences. Air raids against Germany obviously damaged the prestige of the Nazi regime, but the political conditions were never close to the desired collapse in terms of war-willingness sought so desperately by Allied commanders. In case of Japan, bombing certainly lowered both the morale of the population and its willingness to work. Although surrender was an open discussion, there was no attempt to overthrow the regime. A British study examining the effects of bombardments in Hull and Birmingham also concluded that despite the damage achieved the overall willingness of the workforce to work was not affected.[293] Contrary to the assumptions of the industrial web theory, economies were able to recover surprisingly fast. National industries were sufficiently resilient and robust to accept strategic bombardments. Due to the German military success in 1941, thousands of Soviet industrial facilities were destroyed or abandoned. The overall output sank to a fraction of the level before the invasion and the economy faced a complete collapse. Soviet industrial output was able to supply nearly three-quarters of weapons and almost all of the iron and steel in 1942. Despite the immense disaster at the beginning of the war and the fact that the rest of the economy remained as critical as of 1941, the output of each worker in the war industry increased up to three-times during the war. German industrial output peaked in September 1944 despite the heavy bureaucratic structure and increasing losses due to attrition on the fronts and to relentless Allied bombings. In the end even firm believers of punishment had to admit that air power might be the first decisive of factors, but it was never decisive in itself. Anticipations regarding its decisive effects were disproved by events even when the original concept of precision bombing was abandoned and cities

[291] Liddell Hart 1946; Budiansky 2003; Hallion 1997; Luttwak 2001
[292] Faber s. a.; Slessor 1956; Pape 2004
[293] Budiansky 2003; Overy 1981

saw wholesale carpet bombings.[294] World War II showed that punishment as mechanism was more destructive than decisive. It successfully contributed to the process of attrition, but did not produce the expected psychological effect in the form of a quick collapse of enemy morale. Strategic bombing campaigns attacked the foundations of civilized life as the bomber offensive could only be expected to be decisive in the long term. Regarding industrial performance, the bombing campaigns certainly lowered the maximum possible output, but never reduced the overall output until the very end of the war.[295]

National identity and cohesion are powerful driving forces for accepting great sacrifices in which economic and social suffering is regarded as part of the business during wartime. Even the heaviest bombings with conventional weapons can kill only a small percentage of the population. Evacuation, relocation and other counter-measures can further cushion the effects of punitive actions. There is also a huge difference between personal frustration and collective rage as political alienation is often more important than economic hardship and deprivation.[296] Punishment based on aerial bombardments assuming that air power could do it alone proved to be a dead end. As examples showed the only way bombing could destroy anything was to destroy everything. In the end cities became the target and not factories. The physical was attacked as nobody thought of the psychological. This inefficiency can be greatly explained by the fact that people can adapt and accommodate to worsening living conditions as long as the process is gradual.[297]

5.2. Absolute Weapon

The second school of military coercion is called risk. Unlike punishment that is associated with the bomber, risk is associated with the nuclear weapon. The period between the end of World War II and the demise of the Soviet Union is often seen as a period of simple nuclear deterrence. As both superpowers possessed nuclear weapons, a total war without any regard to possible consequences was not feasible. All-out nuclear wars based on large-scale bombardments were considered as mutually suicidal.[298] The focus shifted more to issues regarding how to negotiate and not how to act. Not the sheer existence of the atomic bomb became important, but its effects on the traditional pattern of war that governed the adjustments of states in terms of their relations. It was assumed that the arrival of the atomic bomb changed the main purpose of the armed forces as from then on their existence was aimed at avoiding and not at winning wars. As a consequence coercion by risk focused on achieving the right balance between clarity and ambiguity, rationality and irrationality, credibility and capability.[299] Its mechanism aimed more at affecting the enemy's perception and not his capabilities. The emphasis shifted towards apportionment and timing that were seen as crucial elements in the employment of force. Risk indicates that the civilian costs of

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[294] OVERY 1995; SLESSOR 1954; LIDDELL HART 1946
[295] LIDDELL HART 1946; SLESSOR 1956; MANN et al. 2002
[296] PAPE 1996
[297] BUDIANSKY 2003; LIDDELL HART 1946; SHERRY 1987
[298] BRODIE 1955; PAPE 1996; LIDDELL HART 1946
[299] BRODIE 1946; SNYDER 1999

defying are inflicted gradually as operations escalate slowly in intensity and geographical extent, interrupted only temporarily as a result of the enemy's reactions.[300]

According to the American military strategist Bernard Brodie, the airplane added only a new dimension to the battlefield and altered the traditional patterns of war. The atomic bomb increased the destructive potential enormously as even a single aircraft equipped with such a weapon could inflict an unprecedented amount of destruction on the enemy. He regarded the atomic bomb as an epochal invention in the history of military technological developments. It introduced a greater economy of destruction and turned strategic bombing the dominant form of war to come. The amount of destruction inflicted on the enemy is bound to be decisive that renders other kind of joint operations mostly superfluous.[301] The sheer destructive potential requires politicians who can control their emotions and keep only a moderate amount of adversity. Brodie did not regard fighting as glamorous and emphasised negotiation over action, caution over boldness and reflection over feeling. The presence of the atomic bomb meant that basic decisions about wars had to be made in peacetime. In case of war everything would be much too late. Approaches that rest on traditional military virtues such as seizing initiative to carry the fight to the enemy must be replaced by other and better ideas. The strategy of deterrence was aimed at limiting the tolerable amount of destruction. The emphasis was on avoiding total thermonuclear war at almost any cost since such wars would not permit survival. He emphasised the status quo and the importance of becoming aware of attendant risks and taking them properly into account. For Brodie deterrence has a special connotation since it differs markedly from all-out wars in several respects. It must rely on an absolutely effective threat that is never allowed to break down. This requires a retaliatory instrument that is never called upon to function though its efficiency and readiness must be maintained. Deterrence rests on a system that is always ready and permanently unused. Thus it does not depend on superiority per se.[302]

Deterrence is not absolute, only relative. Its effectiveness must be measured on the power it holds in check and the incentives it provides to possible aggression. According to Brodie the thermonuclear bomb increased the deterrent value of an inferior force much greater than in earlier epochs of history. The increase of its effect is less than proportional to the increase in potential destruction. Each unit of additional damage progressively diminishes the increments of deterrence. Deterrence takes place in the psychological domain and much depends on the other side's actions. It deliberately plays with the uncertainty coming from the enemy's mind. Gains cannot be measured in the simple amount of damage, the degree of incentive to aggression is at the heart of deterrence. The size and efficiency of the armed forces manifest in the physical domain do not matter. What is important is the way those forces manifest themselves in the psychological domain of the enemy's thinking on how those forces will be used. Deterrence means that the enemy must expect a certain amount of vindication and irrationality in case force will be used against his major centres of population. Should war erupt, he suggested developing super dirty bombs that produce the maximum amount of radioactive fallout in order to achieve maximum effect.[303] The American economist and strategist Thomas L. Schelling saw war as a confusing and uncertain activity in which the

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[300] PAPE 1996
[301] BRODIE 1959
[302] Ibid.
[303] Ibid.

involvement of fallible human beings makes any outcome highly unpredictable. He understood international relations as a competition in risk-taking, a test of nerve, a large-scale game in which victory is achieved as much by trick as by merit. Issues in the international arena were decided for him not by the force that can be brought to bear, but by the eventual willingness to bring more force to bear if need be. Manipulating the shared risk of war means exploiting the danger that one opponent could go over the brink and drag the other with him. He admitted that such manipulation contains the risk of escalation.[304]

Similarly to Brodie, Schelling also emphasised the psychological dimension of the conflict to modify enemy behaviour through the employment of both threat and the actual use of force. He suggested targeting the enemy's government and population in a two-fold application of force, as brute force and coercion. In order to win wars, he regarded demonstrations and bargaining much more important than target destruction based on local tactical purposes. Target selection should not be based for him on tactical importance, but on influencing the enemy's perception about one's intent and the character of war. The difference for Schelling was not in the sheer number of destroyed targets, but in the perception of risks and intent that all influence the conduct or termination of war. Extra targets destroyed were just noise that distorts the message. War never involves only antagonism, co-operation also takes place.[305] Armed forces had to be used either to hurt or destroy value, in order to change behaviour and induce co-operation. Consequently, war meant for Schelling both hurting and damaging the value system of the enemy on the strategic level. The outcome was more determined by the manipulation of risk rather than by the actual use of force. He emphasised deterrence, but also stressed that compellence could convince the enemy to accommodate. Military force had to act as a source of pain in order to make threats credible. Waging war required knowledge about the enemy's painful areas and a force that could inflict punishment in a gradual way. The power to hurt had to induce cumulative losses that should be more unattractive than the war is worth or induce the enemy into making concessions, compromises or limited manipulations.[306]

Actions must aim at inflicting loss of value by raising the costs until the enemy comes to terms. War must be conducted in measured doses in a gradual, deliberate and less concentrated fashion. Schelling regarded hurting as an indirect action that depends more on threat than on damage already done. He also demanded restraints in war because risk aims at exacting good behaviour and obliging discontinuance of mischief, but not destroying the enemy altogether. Threat obviates the need for the actual use of force, in which only a minimum amount of it is required to initiate fear of future attacks. Schelling did not exclude that the enemy can value the armed forces rather than the economy, but made a clear difference between coercing the enemy's government and his population. Coercion must be directed against things the adversary values most. Consequently, he always emphasised the difference between civilian or non-military targets and the civilians themselves.[307] Schelling was convinced that few parts of the world were worth of a serious war. Defending such parts or running risks to protect them might preserve commitment to act elsewhere and at later times. Risk-based military coercion was also biased towards the strategic application of air

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[304] SCHELLING 1976
[305] SCHELLING 1976; CLODFELTER 1989
[306] SCHELLING 1976; WHITTEMORE 1999
[307] SCHELLING 1976

power. It rooted in the existence of the nuclear weapon and the destructive effect it stood for. The thermonuclear bomb would not make war more violent, it just concentrated violence in terms of place and time. This overwhelming power rendered the aspect of precision irrelevant and as a consequence targeting did not go beyond vague categories. The assumed causal relationship between aerial attacks and political outcome rested on the overwhelming physical and psychological power of the atomic bomb that did not encourage the re-examination of old strategic bombing dogmas.[308] The prospect of a nuclear war was an excellent background for achieving psychological effects on the enemy despite the fact that coercion by risk rested on a weapon that should never be used. The real value of influencing the enemy to induce a behavioural change was in the threat that these weapons embodied.[309] Terms such as mutual assured destruction reflected the idea that a full-scale atomic war or even a limited version of it would run counter to national interest. Risk focused on the same categories and assumed the same mechanism as punishment. Massive damage simply meant reducing leverage. The real value of risk laid in its potential to signal that future damage will come and cease only if the enemy complies with the demand.[310]

Whereas punishment was intended to get to psychological effects in the fastest possible time without taking care whether the hostage was alive or not, risk focused very much on keeping targets such as the enemy's population and economy alive as long as possible. Although risk aimed at the same targets as punishment, it raised the amount of destruction slowly. The key was to inflict damage at a gradual rate rather than destroying the target at once. Risk acknowledged that effects must be achieved in a nuclear age in which wars were to be fought to be terminated, but not terminated definitively. Compared with punishment, coercion by risk is a rather defensive approach that emphasises deterrence in order to make the enemy accept certain conditions. It is not re-establishing the status quo by using military means, but preserving it and signalling the possibility of further interventions by military means. It is punishment-by-timing since it attempts to inflict costs at a gradual and increasing rate.[311] As Figure 9 displays, similarly to punishment, the primary effect sought in risk was psychological, but due to the absolute character of the nuclear weapon, destruction was not seen as a viable mean. The exclusive focus on influence indicates that risk seemed to be less effective than punishment. Damage in the future instead of the present appears to be a weak coercive leverage. Wars in Vietnam and Korea showed that actual damage can be quite high also with conventional weapons, but it is physically impossible to kill all of the enemy's population and industry. Apart from the time aspect and the means employed there is no real difference between punishment and risk. As a RAND study examining the effects of joint operations on Viet Cong behaviour summarised, enemy units could suffer considerable losses from surprise air attacks, but on many occasions bombing was either inaccurate or failed to inflict major casualties on the enemy.[312]

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[308] Schelling 1976; Brodie 1946; Budiansky 2003
[309] Budiansky 2003
[310] Pape 1996
[311] Pape 1992; Brodie 1946
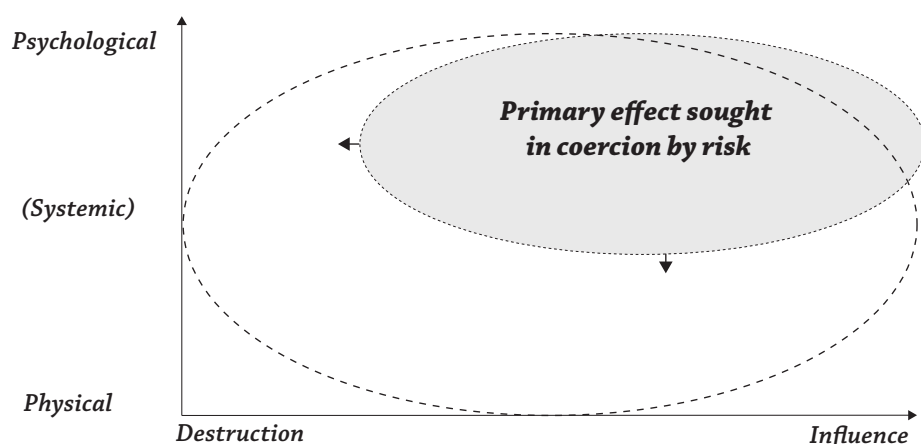[312] Goure 1965; Pape 1996

Figure 9.
Primary effect sought in risk

Source: Drawn by the author

Threatened damage can also not exceed the actual damage imposed by punishment and its step-wise accumulation leaves chance for the enemy to adjust. Risk simply leaves too many opportunities for the enemy to act who can turn the situation to his advantage. Increasing damage gradually can also suggest loss of commitment that can evaporate credibility. As the RAND study pointed out, bombing civilians was rarely a cause to revolt as during inter-rogations captives often denied that attacks on villages were a major cause to join the Viet Cong. It appears that risk strategies can probably enhance the settlement of nuclear disputes when political constraints prevent a thermo-nuclear punishment campaign, but barely work in conventional crises and confrontations.[313]

5.3. Concentric Rings

The next school of military coercion that will be introduced is decapitation. This school resuscitates many elements of classical air force theories advocating strategic bombing.[314] The major theorists introduced will be Warden associated with the decapitation school of coercion and Wijninga and Szafranski who further refined his ideas. The originator of de-capitation as a school of military coercion is the American Air Force officer John Warden. He can both be seen an iconoclast to critics and a visionary to admirers. Warden became famous with his systematic approach that depicted the enemy in the form of five concentric rings.[315] According to him modern industrial societies possess resilient industrial facilities

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[313] PAPE 1996; GOURE 1965; PAPE 1992
[314] METS 1999
[315] WARDEN 1995, GORDON–TRAINOR 1995; MURPHY 1994

with no single key to achieve leverage. The commander's most important responsibility is the correct identification and appropriate strike of enemy centres of gravity. The latter should be done by decisive blows that come as a result of air superiority. No state has lost a war while it was able to maintain air superiority that is always the prelude to military victory.[316]

Similarly to most strategic bombing theorists also Warden advocated the importance of air superiority. Key to it was for him materiel, personnel and position. Due to their combination any analysis is impossible and simplification is required. Similarly to Douhet, he also described defensive operations as a negative concept since they delegate the initiative to the enemy. In detailing offensive operations he argued that the enemy's centre of gravity might be in equipment such as planes and missiles, logistics such as supply support, geography such as operational and support facilities, and personnel such as pilots and command and control facilities.[317] He regarded the last to be the true centre of gravity, that if successfully destroyed or isolated equals decapitation with serious or even fatal consequences. Command and control facilities are resilient and difficult to destroy, three areas such as information, decision and communication appear to be vulnerable. A successful attack on one of these spheres decreases the effectiveness of enemy operations as even slight disturbances can be dangerous or even catastrophic.[318] Although all services can attack those centres of gravity, he thought that only air power could circumvent enemy forces and attack directly.[319] Warden also emphasised that joint operations had to be conducted in a way that directly supports political objectives. Furthermore, military objectives and plans had to be tied to political objectives as seen through the enemy's eyes. Military objectives generally fell for him into three categories such as destruction of enemy forces, the enemy's economy with its war-related components, and his will to resist. He asserted that direct attacks on the will of the population were difficult to carry out. The population is either more resilient than expected or has no influence on the government. Once the objectives are identified he suggested an in-and-out campaign. His proposed indirect approach did not focus on the enemy's armies and made war shorter and cheaper in terms of blood and treasure. His suggestion was to go directly to the political centre of gravity and avoid direct encounters with the enemy's forces. He saw air power as a key force and claimed that in modern warfare orchestration and not subordination or integration of services was important. Gaining territory should not be regarded as an objective for the military since focusing on territory was beguiling, time deceiving, and the commander must be careful with both.[320]

He termed the approach to link political ends with military means directly to strategic warfare. This warfare rested on deductive top-down thinking and proceeded from the big picture to the small. His early ideas on orchestrating war were further developed and summarised in a model depicting the enemy as a system of five rings. The rings in concentric order are fielded military, population, infrastructure, organic essentials and leadership as the bull's eye in the middle.[321] Strategic warfare focused on the totality of the enemy to produce desired effects in which the clash of forces was only a means to an end, but not the end

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[316] WARDEN 1989

[317] Ibid.

[318] Ibid.

[319] SHULTZ–PFALTZGRAFF 1992

[320] WARDEN 1992; WARDEN 1989; GRAY 1984

[321] WARDEN 1995; WARDEN, 1999; WARDEN 1997–98

in itself. His approach rested on the assumption that the enemy is composed of numerous subsystems that can be affected to combine minimum effort with maximum effect. Warden argued clashes of fielded forces were the most costly and least productive in the majority of cases.[322] According to him, war could be depicted in the form of a simple equation in which the physical and moral components defined the outcome.

$$(Physical) x (Morale) = Outcome$$

Whereas the physical is theoretically knowable the moral is beyond the predictable. Consequently, efforts must focus on the physical domain. Military objectives at the strategic level must have a political value that imposes paralysis upon the enemy on the highest level. He understood paralysis as changes to one or some parts of the enemy's physical systems in a way that he decides to adopt our objectives, as nay form of physical opposition is impossible for him. If any part of the system stops working properly it also affects all other parts. Warden also admitted that there might be a delay between strategic events and subsequent tactical effects. In strategic warfare the entire enemy system is targeted. It starts with large entities and works downwards to small details as required.[323] Decapitation aims at enemy command and control by threatening it directly or through indirect pressures on the outer rings. Warden regarded control of the enemy's command structure as the ultimate goal of joint operations. By moving outward, the redundancy of the enemy system grows and the chance of being dragged into a classical war of attrition and annihilation increases. He saw the purpose of war in doing something to the enemy's centre or to prevent him from doing something to ours.[324] Affecting the bull's eye either forced the enemy to make concessions or he was no longer able to pursue actions. He asserted that threatening the command element directly was not always possible and indirect pressure had to be applied to make the enemy realise that further actions were impossible and he was unable to continue with combat activities. He termed this sort of war the hyper-war that capitalizes on advanced technology, precision in hitting the target, and surprise at the operational and strategic levels. Hyper-war stood for the ability to attack all of the enemy's key operational and strategic nodes near-simultaneously. In this sort of war strategic paralysis was achieved through parallel attacks by hitting targets in a single blow thus making an effective response impossible. This is just the opposite to the traditional serial warfare and made him conclude that the history of warfare has eventually arrived at the age of the airplane.[325]

Warden's systemic approach soon became popular in the air force community and resulted in an abundance of clones and modifications.[326] Among others it was refined and made more focused also by Wijninga and Szafranski. They assumed that unlike during the second wave when dominant mechanisms and measurements for air targeting were based only on utility, in the third wave the focus would move beyond utility targeting aimed at things that enemy leaders value. The enemy for them was also reducible to targeting templates, but they emphasised that it is equally important to realise that the enemy is a complex human

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[322] Warden 1995; Warden 1992; War Department 1943
[323] Warden 1995; Clausewitz 1993
[324] Warden 1992; Warden 1995
[325] Warden 1992
[326] Felker 1998

organisation. Their composite model combined Warden's five rings with Maslow's hierarchy of needs to show that value targeting of leadership at every level of war and utility targeting of military assets was the right combination. This way the enemy was equally affected in the material and non-material domains. Axiological targeting capitalised on attributes of the third wave with its global connectivity. Whereas utility targeting engaged objects which were of value in the physical domain, value targeting was aimed at the minds and needs of leaders. Utility targeting denied functions, value targeting deprived needs. Due to their combination the enemy declared cessation of fighting as a desired effect. In sum, axiological targeting regarded non-military centres of gravity as more important and counter-value targets as more strategic than counter-force targets.[327] Decapitation can be seen as the culmination of earlier strategic bombing ideas wrapped in a different and more sophisticated vocabulary. It was a theory that resuscitated old ideas of strategic bombing by injecting new technology and terminology into it. The enemy was not one mass with only two vague strategic vulnerabilities such as population and economy, but a system depicted as interlinked concentric rings. This approach also regarded the enemy mechanistically as a passive collection of targets that could be reduced to simple templates.[328]
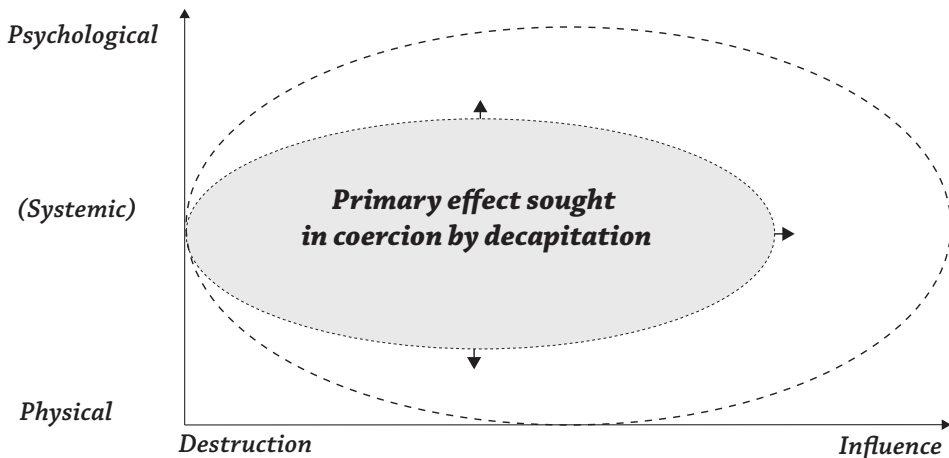

Figure 10.
Primary effect sought in decapitation

In decapitation air force was regarded as a central service, a strategic instrument capable of organising on its own at all levels of war. Decapitation was based on the assumption that air power could create systemic effects beyond the scope of the geographically oriented surface battle. It did not need to proceed through the tactical-operational-strategic levels of war to fight prolonged duels of powerful weapons against powerful defences.[329] Decapitation meant

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[327] Wijninga–Szafranski 2000; Kan 2004
[328] Budiansky 2003; Ware 1995
[329] Noedskov s. a.; Douhet 1983

that air power can achieve systemic effects with theatre-wide significance just bypassing surface forces. Similarly to the theories of the inter-war period, the mechanism upon which decapitation rested was more a principled belief rather than a reflection of reason. Belief however, regardless of the power and intention behind is by definition not susceptible to any rational explanation.[330]

5.4. Surface Refocus

The last school of thought to be introduced is denial. It reflects the fact that inflicting sufficient pain on the enemy's society or decapitating the political and military leadership is simple beyond the capacity of conventional armed forces. In contrast to the previous three schools of coercion, it is again surface oriented. The underlying mechanism seeks to ruin the feasibility of the enemy's strategy in terms of achieving his territorial objectives. Denial stands for compelling concessions in order to avoid futile expenditure of resources. It does not attempt to cause suffering to the population, but focuses on preventing the enemy from achieving his territorial objectives.[331] Although denial is not as consistent as the previous schools of military coercion, the approaches introduced here make it possible to discern a clear relationship with the three common elements of effects-based operations.

The British John C. Slessor, Marshall of the Royal Air Force differentiated three types of wars that had appeared since the eighteenth century. Whereas the first type was the classical war of battlefields and sieges, the second was the war of lines such as World War I. The third type was the war of vast areas as waged in World War II. He also described this type of war as the first air war in which the enemy country itself and the population became the primary objectives of attacks. He believed that modern air power made the traditional meaning of the battlefield irrelevant and as a result thoroughly examined the relationship between air power and armies.[332] He saw the object of an air force in a land campaign to assist and co-operate with the army in the field. For him the aim of war was to defeat the enemy's army and air force through destruction of his land forces, communications and system of supply. Slessor also paid attention to another aspect of waging war that he regarded as the positive influence of direct air strikes on objectives on the ground. Once the enemy army was defeated, he suggested the ultimate reduction of the enemy nation by air measures. This could be directed against vital centres to put the population under unrestricted air actions. He regarded air superiority to be the prerequisite for the control of air communications with the aim to break down the resistance of the enemy's army. Otherwise the air situation had for him no importance in any form of war except of its effect on the situation on the ground. Successful air operations required a dynamic enemy since air action against the communications and back areas cannot have a decisive effect unless the enemy is being forced to fight.[333] In order to achieve air superiority he suggested two principles. The resolute bombing of the enemy's vital centres, the destruction or even interruption of which can result in fatal effects in terms of continued vitality. Since he did not regard vital

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[330] WARE 1995
[331] PAPE 1996; PAPE 1992
[332] SLESSOR 1954
[333] SLESSOR 1936; SLESSOR 1954

centres strictly as military assets, he further proposed direct actions against the enemy's air forces to a varying degree.[334] He assumed that the importance of vital centres might vary from time to time according to the strategic situation and claimed that the selection of appropriate objectives must rest on the most exhaustive use of resources and information. As Slessor argued such a meticulous system of intelligence should involve all available political and industrial sources.[335]

Air superiority could only be secured by offense with objectives falling into two main classes with distinctions becoming nebulous as soon as war starts. The first objective was fighting troops and meant killing in order to prevent the enemy to be in the right place at the right time or reducing his fighting efficiency by denying access to food supplies and various sorts of war material. Fighting troops could also be conceptualized broadly as lines of communications and headquarters. The second objective was supply, which he subdivided into rough headings such as production and distribution. Whereas the former meant for him the movement of goods of every kind from source up to the area of operations including their reserves, the latter stood for distributing them throughout the lines of communications.[336] His concept of strategic air concentration was due to the fact that he underrated the effects of bombing on the morale of the civilian population. In a Clausewitzian fashion Slessor admitted that the moral effect was first and foremost dependent on the material effects. Thus air power should be used in a concentrated way to achieve a decisive effect for which he suggested fighting troops to be the primary objective and supply only in case of relative military inactivity. He knew that material and machinery would play a great part in future wars; he regarded their production facilities less vulnerable. Strategic bombing in the form of aerial offensives could only limit and reduce them.[337] He saw the role of air power mainly as creating difficulties where they do not exist, and intensifying them when they exist already. Thus air power had the capacity for him to limit the margin of safety on the line of communications of an enemy army.[338] Another British, the military historian and strategist B. H. Liddel Hart regarded the idea of a nation at arms a mere worship that stressed quantity over quality with national objectives achieved only by mass destruction. According to him victory is not an end in itself. It is useless if the end of the war finds the victor so exhausted that he is defeated in peace. The true aim of war was for him to subdue the enemy's will to resist with the least amount of human and economic losses. The destruction of the enemy's armed forces is just a means as Liddel Hart questioned the usefulness of a decisive victory in battle if the victor bleeds to death as a result of it.[339] He understood strategy as more than the sheer movement of forces. It meant for him simply achieving an effect on the enemy. His idea concerning grand strategy was to direct and regulate all resources of a nation, all available instruments in a way that a better state of peace could result. Effects could only be achieved by sound calculation and co-ordination in terms of ends and means thus leading to a perfect economy of force.[340]

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[334] Slessor 1954
[335] Ibid.
[336] Ibid.
[337] Ibid.
[338] Ibid.
[339] Liddell Hart 1925; Liddell Hart 1999
[340] Liddell Hart 1967

He advocated the exploitation of movement and surprise representing the physical and psychological spheres. Only surprise could lead for him to advantageous circumstances in which serious fighting does not take place. In the physical sphere he named four effects that resulted through movement such as upsetting the enemy's disposition, separation of his forces, endangering his supplies and menacing his route of retreat. Liddel Hart thought that effects in the physical sphere would penetrate into the psychological sphere and cause the impression of being trapped. This can only be achieved through the line of least resistance in the physical sphere. This is equivalent with the line of least expectation in the psychological sphere. He suggested a preceding distraction that deprives the enemy of his freedom of action in both spheres. His famous indirect approach meant maximum possible concentration with minimum necessary force. He stressed that in order to hit with effect, adaptability is needed to operate along lines offering alternative objectives. He regarded cutting communications as extraordinarily important and presented the deduction that the nearer to the force the more immediate its effect. The nearer the cut to the base the greater is its effect. In either case the effect becomes much greater and more quickly felt if made against a force that is moving and not stationary.[341] He expected more success and more effects when cutting communications as far back as possible. Whereas the minds of enemy troops could be influenced by a stroke close in the rear, a stroke farther back would rather influence the commanders' mind. He praised the advent of new technologies from which he valued the air force as a contributing factor to dispersed strategic advance. Advancing forces should not be distributed as widely as compatible with combined actions, but dispersed as much as compatible with cohesion. The effectiveness of armies meant paralysing the enemy's actions and not crushing his forces. Concentration meant for him waging one's own strength against enemy weakness as a result of calculated dispersion.[342]

In connection with the arrival of tanks on the battlefield, he named their moral effect on enemy infantry that induced both mental and physical paralysis of the enemy's command.[343] In the airplane he saw the weapon that can strike at the enemy's economic and moral centres to attain a direct end by the indirect application of means. He fully appreciated the mobility of the airplane and called it the knight-move into warfare. The combination of air power and increased ground mobility resulted in more effective achievement of economic and moral objectives. He believed that mechanisation both on the ground and in the air made an easier paralysis of the enemy's vital organs possible without the need to destroy him through hard fighting. He pledged for paralysing and striking civilian objectives deep in enemy territory. As he emphasised disorganisation and demoralisation both have paralysing effects on the enemy and have always been well-understood by the true masters of the art of war.[344] His indirect approach anchored in the assumption that attacking the military's command, control and communications facilities paralyses the armed forces as a whole that can overlap and disintegrate the nation behind. Contrary to the theorists of strategic bombing he assessed industrial bombing as less decisive than actions against military strategic objectives. Instead of striking the capital and other vital centres, Liddell Hart suggested disposing the enemy's main forces first. The enemy's air force must be defeated first face-to-face in order to realise

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[341] Ibid.
[342] Ibid.
[343] LIDDELL HART 1999
[344] LIDDELL HART 1967; LIDDELL HART 1999

any benefit. Later in the nuclear age, he opted for indirect, strategic actions against military objectives and not industrial attrition. He always stressed the superiority of strategic operation over battle by stating that the true aim of war is not so much to seek battle as to seek an advantageous strategic situation that does not lead to victory in itself, but its continuation by battle can surely achieve this.[345]

According to the American political scientist Robert A. Pape, the essence of denial was to cause an imbalance of enemy forces by hitting military targets in the enemy's homeland until he compels and modifies behaviour. Denial as a mechanism threatens to defeat the enemy's military adventure by reducing his military capacity to control areas. It suggests nothing, but suffering the costs of the conflict. The enemy cannot gain or hold the disputed territory since his strategy is targeted in order to undermine his confidence.[346] Denial stands for the application of military means in order to prevent the enemy from achieving his political goals. Successful denial requires the possession of superior military capabilities for achieving a decisive victory on the battlefield. Denial might not always work and as Pape acknowledges, there is no other option than to inflict a decisive military defeat on the enemy.[347] Although denial reduces the probability that resistance would yield benefits and signals; not yielding involves the futile expenditure of more resources, no special efforts are made to cause suffering to the population.[348] Should the coercer want to obtain more than he can compel failure is inevitable even when denial is partly successful. The enemy is always flexible and ready to change his strategy. This way he is able to minimise or negate the coercer's actions. Consequently, denial focuses on particular vulnerabilities within the enemy's strategy for success as simply destroying targets has limited coercive value. Denial attempts to exploit the enemy's military strategy, which can be described either as conventional/mechanised or unconventional/guerrilla warfare.[349] The term mechanised refers to traditional attrition and annihilation warfare. The objective of such warfare is to destroy enemy forces through intense and extended battles along the frontlines. The focus is on inflicting losses and destroying cohesion among units and certain combat functions that are highly dependent on networked logistics and communications. The term guerrilla indicates units that are dispersed over a wide area and avoid decisive battles. In terms of denial, guerrillas pose a problem since coercers can obtain concessions only over a specific territory that has been denied to the enemy. Losing one territory does not mean losing another and demanding more than one can persuade the enemy which means that coercion can eventually fail.[350]

Regardless of the enemy's military strategy pressures must be constant over a considerable period of time. Giving the enemy breathing space means that he can improve his chances by regaining military capabilities or attracting new allies. Demonstrating capacity by force over the disputed territory also requires strong financial commitment.[351] In denial the enemy forces are attacked to the extent they become too weak to oppose friendly ground

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[345] Liddell Hart 1967
[346] Pape 1996
[347] Pape 1997–98; Pape 1996
[348] Pape 1996
[349] Pape 1992; Pape 1996
[350] Corum–Johnson 2003
[351] Pape 1996

forces in seizing the disputed territory or to inflict high casualties. Thus campaigns can include attrition by destroying arms-manufacturing facilities, interrupting supplies and disrupting lines of communication.[352] Pape differentiated three kinds of denial. The first is support of ground units, in which the air force is applied as flying artillery. This strategy was employed during World War I when the newly established air units tried to support the army in the field by dropping bombs from the air. The German Luftwaffe also pursued such a strategy later successfully in order to support combined arms assault to break through enemy lines. The second is strategic interdiction that involves large-scale operations focusing either on destruction or isolation of enemy military production facilities. The aim of such operations is to reduce the quantities of enemy war materiel. The third is operational interdiction aimed at inducing operational paralysis and includes actions such as attacking certain theatre-level combat support functions to reduce the enemy's ability to co-ordinate forces in the field.[353] Altogether his conclusion was that denial strategies work much better against conventional mechanised forces than against guerrillas who are mostly immune to coercion. Coercers should often expect to pay the full costs of military success if they want to extract political concessions. In this case, he suggested attacking military targets instead of politically sensitive civilian centres to force the enemy to change behaviour. Denying the enemy his fielded forces at the earliest possible time meant for him degrading his capacity to wage war. Denial stands for avoiding unnecessary destruction of the enemy's social and economic infrastructure, but in case it fails, denial can also bring the coercer closer to victory through the application of brute force.[354]

Denial-based coercion can be seen as the antithesis of punishment, risk and decapitation. It neither focuses on the enemy's population and economy, nor on his leadership. In its purest form denial is smashing enemy military forces and weakening them to the point where friendly ground forces can seize disputed territories without the danger of suffering unacceptably high losses. Denial campaigns focus on arms-manufacturing facilities, interdiction of supplies to the front, disrupting enemy movements and communication, and the attrition of enemy armed forces in the field. It accords with Clausewitz who also assumed that the real key to the enemy country is his army. As he emphasised the annihilation of the enemy's military aimed at a considerable weakening can lead to the loss of a particular territory. The enemy must either be made literally defenceless or put in a position that increases this probability.[355] Denial is an approach that, similarly to decapitation, rests on extensive application of precision weaponry, but focuses on a much wider set of targets. Instead of achieving full paralysis of the enemy, denial focuses on his armed forces through a combined application of ground and air power. As depicted in Figure 11 denial indicates a low level of ambition in terms of the mechanism selected and means applied to achieve physical effects through destruction. It stands for a careful attrition and annihilation in which air power is an effective and lethal complement to ground units to efficiently crush enemy armed forces. Attacks coming simultaneously from air and ground put the enemy in a quandary and defeat him relatively rapidly and with few casualties.[356]

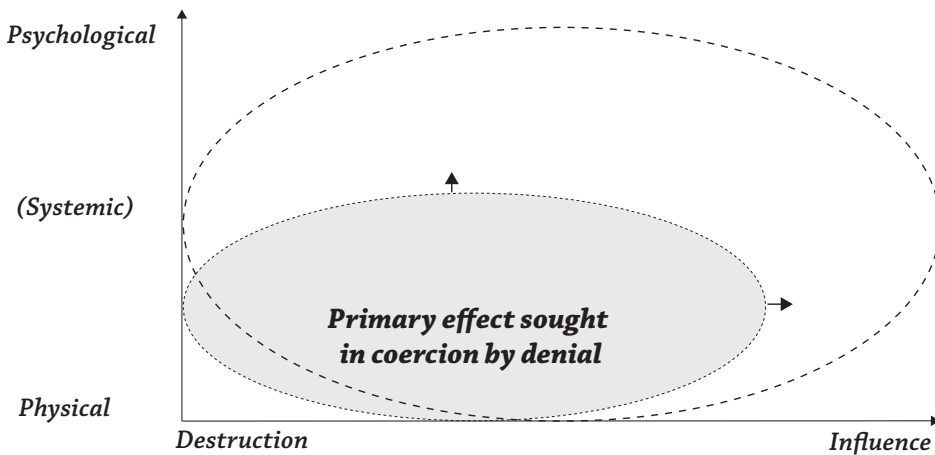
[352] Ibid.
[353] Ibid.
[354] Ibid.
[355] Ibid; Clausewitz 1993
[356] Pape 2004

Figure 11.
Primary effect sought in coercion by denial

Denial appears to offset the most important drawback of the air force. Tactically air power is most rapid in operation and sudden in causing shocks, but strategically it is less fitted to produce desired decisive effects. Aerial warfare always bears the chance to lead to attrition warfare on the strategic level. Denial means defeating the enemy's capacity to organize its resistance that comes as a result of being concentrated around large ground forces.[357] It is based on significant ground forces even if they can occasionally be put into an air-support role. Ground forces do not swarm around the enemy, but confront his units head-on in a Clausewitzian fashion. Whereas decapitation calls for transformation of the armed forces to make strategic bombing more efficient, denial emphasises better integration of the services in order to achieve more effective destruction from greater range and at higher speed. Simply put, denial stands for exploiting fire-power and movement.[358] In denial campaigns air operations are an integral part of the entire manoeuvre plan and make the battlefield the focus of the coercer's efforts. Denial confirms the RAND study mentioned earlier in relation with risk that in the end only the ground forces could transform the Viet Cong from hunters to hunted. It was the ground forces that defeated them decisively and established complete control and security over the population. The main purpose of air harassment was only to create favourable conditions for more effective ground offensive operations.[359]

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[357] Liddell Hart 1946; Pape 2004
[358] Pape 2004; McPeak 2004; Warden 1997–98
[359] Budiansky 2003; Goure 1965

6. Effects and Causality

The four schools of military coercion showed that the origins of effects-based operations as a joint force employment concept are rooted in the advent of powered flight. It can be traced back to air-power enthusiasts such as Douhet, Mitchell, members of the ACTS and Warden. It also relates to thinkers of a more general kind including Slessor, Liddel Hart, Brodie, Schelling and Pape. Most theorists were passionate rather than analytical, and most mechanisms rested on unproven assumptions advocating quick, clean, mechanical, impersonal and linear solutions to achieve victory in war. From the earliest days of powered flight theorists have struggled to define and measure the success of joint operations in terms of effects achieved on the enemy.[360] They embraced the airplane as a formidable and flexible weapon that most cogently revealed the relative effectiveness of various coercive mechanisms. Although in its infancy the airplane had momentous effects during World War I as its flexibility and versatility impressed many. This most significant technological innovation of the early 20th century and its possible application for military purposes resulted in challenging theoretical, doctrinal and operational concepts with many shortcomings. Most theorists assumed that precise intelligence would be always available, limiting or disturbing factors could always be minimised, concentrating on ends rather than means would be a superior alternative to the traditional mechanisms of war, controlling could substitute for destruction, and strategy could be reduced to targeting issues and templates.[361]

6.1. Assuming Causality

Similarly to official NATO doctrines all four schools of military coercion aimed at harnessing cause-and-effect relationships in military operations to achieve desired effects on the enemy. The mechanism for achieving an effect (E) can be understood as a function (f) of an action (a) on an object (o). In a similar fashion in military coercion the desired change (C) of the enemy can be understood as a function (f) of a given amount of force (f) applied on a certain target (t).[362] This can also be depicted in the form of a simple equation:

$$C = f(f,t)$$

Most theorists regarded the airplane the ultimate weapon as it was not committed to any one course of action and could switch from one objective to another on short notice. Apart from denial, the basic assumption was that a comprehensive and mostly analytical study can reveal the proper targets to destroy. This combined with a well apportioned amount of

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[360] Paret–Craig –Gilbert 1986; Peach 2003

[361] Slessor 1954; Pape 1996; Baylis et al. 2002

[362] Mueller 1998

decisive force could trigger a mechanism that reveals the preferred effect. Due to its inherent mobility and flexibility the airplane was regarded as a winning factor of the first order possessing the ability to deliver decisive blows. The conviction that this new weapon is superior to the traditional surface-bound services has led many to believe that the airplane is an effective coercive instrument and represents a superior alternative to protracted ground wars. Most theorists had a firm belief that similarly to the British inter-war experience, in Mesopotamia technological advances had reduced war basically to an act of dealing out punitive measures in precision-calculated doses to send political signals or keep the enemy under control.[363]

They indicated that modern technology turned war into an activity that could be controlled in a top-down fashion. Similarly to the characteristics of effects-based operations, military coercion theories are based on three common elements. The first element, *effects-focus* is manifest in the idea of achieving effects on the enemy although depending on the respective schools of thought the primary effects sought differed. An examination of the four schools of military coercion made it clear that punishment and risk stood for achieving psychological effects. Whereas decapitation stood for achieving systemic effects on the enemy, denial emphasised the importance of achieving physical effects. The second element, *advanced technology* was defined by the state of available military technology embodied in the airplane and various sorts of bombs that were regarded as significant innovations in the respective periods. The technology that drove punishment was the airplane carrying various sorts of aerial bombs. Risk was driven by the airplane carrying nuclear bombs. Decapitation was enabled by stealthy airplanes and precision bombs. Denial came as the result of stealthy and non-stealthy airplanes, dropping mostly precision bombs. The third element, *systems thinking* displayed the biggest diversity of ideas as it largely depended on the individual mind of the respective theorist. In terms of punishment, selected targets such as population and industry indicated a focus away from the battlefield. In a similar fashion, risk focused mostly on targets outside the battlefield such as leadership, and population. However, unlike the exclusive focus of punishment, attacks on the enemy's military were seen as an option. Decapitation rested on systems thinking as targets are grouped around five categories in the form of concentric circles such as the fielded military, population, infrastructure, organic essentials and leadership. Denial had a strong military focus since it stood for targeting military related assets mostly on the battlefield. The basic assumptions of all theories mirror the remarkable trinity of Clausewitz, albeit the emphasis shifted from time to time. The theories reflected the existence of primordial violence, the play of chance and probability, and subordination, which stand for the people, the military and the government. Although it was at the core of military coercion theories to rid themselves of the bloody Clausewitzian heritage, no-one could surpass the boundaries he set.[364]

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[363] SLESSOR 1936; War Department 1943; LIDDELL HART 1925; DOUHET 1983; BAYLIS et al. 2002; PETERS 1999b; KNOX–MURRAY 2001; PARET–CRAIG– GILBERT 1986
[364] CLAUSEWITZ 1993

6.2. Common Denominator

Aerial attacks or bombings are the common denominator in all theories. Punishment theorists left the battlefield intentionally in order to find a mechanism that allowed achieving psychological effects directly or indirectly on enemy population. They advocated that through strategic bombing it becomes possible to achieve a popular revolt and coerce the enemy leadership to comply. Risk-oriented coercion was based on the basic tenets of punishment, but as a broader and slower approach it aimed at influencing both population and leadership. Theorists of this school hoped to achieve psychological effects through manipulation of the fear of a nuclear escalation. Thus risk also sought to achieve psychological effects mostly outside the battlefield. Decapitation refocused from the psychological domain and emphasised the enemy's physical side. It claimed that a given amount of systemic effects achieved on command and control facilities could result in strategic paralysis that leaves no other option than to comply. Denial closed the gap that began to emerge when early theorists wanted to escape the brutality of the battlefield and the carnage of the trenches. Denial again focuses on the enemy's military capabilities through achieving physical effects mostly against military and military-related targets. Unlike the other theories, the emphasis is again on battlefield attrition and annihilation resulting in physical effects.[365]

The three common elements indicate an approach in which joint operations can be seen as a management activity possessing a clear cut beginning and a definite end. Their conduct is understood as the exploitation of technological advantage and the efficient use of scarce resources in which capital can mostly substitute for personnel. The third wave stands for asymmetric wars. In such wars the enemy has often no traditional centres of gravity or resources that can be destroyed by state-of-the-art weaponry. Another challenge is that in wars, the relationship between ends and means might be clear at the strategic level. This may become considerably less clear as specificities emerge and more ambiguous as the full range of military operations expands. Wars demand full-time commitment, but offer only prospects for a provisional, modest and always fragile form of control.[366] As long as there is no peer competitor for the West on a global or regional scale, with traditional attributes, most assumptions regarding causality in joint operations have limited applicability. It would be increasingly difficult to directly link military means with political ends, tactical actions with strategic objectives in order to identify, penetrate into and destroy the very centres of gravity within the enemy organisation. It would also be inherently difficult to circumvent the slow and painful processes of attrition and annihilation with the aim to achieve quick and decisive victory in the psychological domain aimed at influencing enemy thinking and behaviour. It would be increasingly difficult to save precious resources in terms of time, money and manpower. Collapsing the enemy's system from the inside-out that exists outside the traditional boundaries of a nation-state would be most difficult. In asymmetric wars, information superiority and technological sophistication can best be seen as enablers, but not as ultimate leverage. Thus the assumed advantages of detecting cause-and-effect relationships in joint operations can mean no advantage at all. Apart from the objections that come from the attributes of the third wave and the challenges posed by asymmetric

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[365] HALLMAN 2005
[366] DORFF 1996; MURPHY 1994; HARDT–NEGRI 2004; *A Defining Moment* s. a.

warfare, any sober theory of war must take into account that waging war has always been more than linking ends with means in a simple deductive fashion, and detecting obvious causality on the strategic level in the form of desired or decisive effects. War is fought on a spatial and temporal continuum involving both the material and non-material domains.

It is as much a physical as a psychological phenomenon that spans over many layers. As the limitations of military coercion theories indicate, waging war involves an abundance of physical, systemic and psychological effects. Both punishment and risk put unilateral emphasis on psychological effects. Decapitation addressed only certain areas of population centres that harbour leadership facilities. Its basic assumption was that upgraded strategic bombing campaigns based on the application of advanced technologies could crush the enemy's resistance. Strategic paralysis meant that the will to resist is not broken, but the systemic effects achieved simply do not allow the enemy to command and control his functions properly. Decapitation advocated that many systemic effects are sufficiently strong to make the enemy's resistance futile. The underlying assumption was that the greater the percentage of targets hit in a single blow the more impossible it becomes for the enemy to respond. Thus, taking into consideration the philosophical foundations, there is barely any difference between decapitation, punishment and risk. Denial on the other hand takes war back to the battlefield. It suggests that careful attrition and annihilation focusing on physical effects can subsequently generate systemic and psychological consequences sufficient to achieve victory. As one observer pointed out, within the framework of denial, the effects that interrupted road and rail traffic in 1991 in Iraq were neither psychological nor temporary, but physical and cumulative in nature.[367]

6.3. Attrition and Annihilation

In denial, the traditional mechanism of war aimed at attrition and annihilation of the enemy's armed forces was again writ large. The assumed ability of air power to achieve strategic effects motivated military thinkers to search for mechanisms that allow victory without the involvement of irrational costs and losses. In the end and at least in theory air power offered a promising solution to protracted surface-oriented attrition and annihilation warfare.[368] Unfortunately, the basic assumptions have never been really validated. Most theorists have felt rather than known what air power can and cannot achieve. Regarding the psychological effects of air operations against strategic targets, one can conclude that bombing alone cannot secure war aims and limitations should be expected regarding its coercive leverage. Victory in war requires multiple pressures such as attacks on deployed enemy forces, destruction of various high-value targets, better co-operation with ground units and better integration of psychological operations with strategic air attacks. Examples from the 20th century showed that enemies capitulated or came to terms only after serious battlefield defeats of their deployed forces. It appears that after a century of the air force's struggle for independence and claiming the ability to achieve strategic-level effects on its own, only through denial has it become possible that the balance of forces on the battlefield

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[367] WARDEN 1995; LUTTWAK 2001
[368] HALLION 1997

would slowly shift to the enemy disadvantage as long as fighting continues.[369] Air-force theories were originally fed by the idea that war can be taken away from the battlefield. However, the airplane only established a new dimension and fought in it with equal ferocity. Although air power's maturity and independence was regarded for many years as the driving force in military coercion, in the end it was on the battlefield where air power ascended to equality with the other services.[370] Regardless of the age in which mankind lives and the technology it uses, joint operations are dirty, up-close and personal experiences that often defy ideas elaborated on the strategic level. Air enthusiasts saw in the air force the service that could control the enemy from the air. Effects achieved by air power have been helpful contributions to success in war, but they also indicate the impossibility to control a war from the air any more than from the business end of a gun.[371] Focusing on enemy psychology was already seen after World War I as a dead end. As the French Marshall Foch bluntly confessed at the beginning of the war, many believed that morale alone counted, but it turned to be an infantile notion.[372]

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[369] Paret–Craig–Gilbert 1986; Hosmer 1996; Hinen 2002
[370] Brodie 1955; Budiansky 2003; Clausewitz 1993
[371] Gordon–Trainor 1995; Slessor 1956
[372] Possony–Mantoux 1943

7. Causality and Unpredictability

The four schools of military coercion made clear that they are in sharp contrast with the frictional nature of war as outlined by Clausewitz. Given this contradiction it is of utmost importance to elaborate on it in detail. The characteristics upon which the common elements of effects-based operations and the characteristics of joint operations in NATO doctrines are built are causality/deduction for effects focus, intangibles/control for advanced technology, and categorisation/analysis for systems thinking. As introduced earlier in this book, war's frictional nature made Clausewitz conclude that effects in war cannot be traced back to single causes, as several concurrent causes are normally at work. Investigating the relationship between causes and effects becomes easy only if they are closely linked. An effect that appears correct at one level can become objectionable on a higher level and imply a new basis for judgement. The distance between causes and effects is proportionate to the number of other factors to be considered.

Friction is not a technical problem for Clausewitz that can be eliminated. Novelty must always be expected in war and indicates that effects are never predictable with a high degree of certainty. Friction always dims expectations in terms of causality and the ability to achieve desired effects. The consequence is that in joint operations one must be satisfied with understanding certain general features in terms of correlation, rather than attempting to discover a mechanism that links causes with effects directly. There is simply too much going on that does not allow every move to be orchestrated from the top, but often require uncontrolled and parallel actions. Consequently, in joint operations the central challenge is to manage change, which requires a certain amount of flexibility. Events happen on multiple levels ranging from the top at headquarters to below at the front lines. Addressing the challenges posed by the enemy requires more than causal assumptions imposing unnecessary constraints. Friction indicates that often it is more important how one does things than what things one does. In Western military thinking there is a unilateral emphasis on outputs articulated as effects in which exploiting causal relationships play a great role. War and joint operations often appear to be a paradoxical activity. They are composed of constant, universal, and inherent qualities such as violence and chance – all pointing towards uncertainty.[373] Despite the tendency of the theorists to assume causality, the mechanisms they proposed for the successful conduct of joint operations does not allow inconsistencies and dangerous simplifications. War is not a phenomenon that can be waged in a clinically clean manner by focusing only on the ends in terms of carefully selected desired effects. The proverbial frictional mechanism of war as outlined by Clausewitz cannot be solved through analysis and deduction.[374]

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[373] SHEEHAN 2007; KOLENDA 2002
[374] CLAUSEWITZ 1993

7.1. Structural Analysis

In order to better understand the frictional nature of war and joint operations the author suggests examining friction along two properties such as couplings and interactions. Although the properties are of a qualitative nature and were originally introduced to understand and study the way accidents happen, in a slightly modified form they equally explain the way unpredictability develops in joint operations. The proposed structural analysis displays unpredictability as a phenomenon that comes mostly in the form of unintended and unexpected effects.[375] Although joint operations happens on a continuum, the proposed properties allow for dissecting it into four rough areas representing different sorts of relationships that allow to address the intricate relationship between causes and effects. Whereas interactions can either be linear or complex, couplings may be tight or loose. Due to their simplicity and comprehensibility, linear interactions allow for visible and simple relationships between causes and effects. Linearity can be anticipated since the underlying sequence of causality is directly comprehensible. Complex interactions indicate branching paths, feedback loops and jumps from one sequence to another. Here connections multiply in unexpected ways often revealing unintended and unfamiliar effects. Causal relationships are outside the normal and assumed sequence of events and are either invisible or not immediately comprehensible.[376] Linear interactions can also display invisible cause-and-effect strains, but they occur mostly in a well-defined segment and sequence. Complex interactions do not stand for a well-defined segment or sequence as causes and effects are linked differently and may interact in unexpected ways. Causal processes are more indirect and inferential so that not even the tip of an iceberg is visible. Complex interactions are full of misunderstood or missed signals and faulty information regarding causes and their likely effects. Whereas linear interactions have minimal feedback-loops and are generally clear and concise, complex interactions are more likely to display unanticipated or unintended relationships. The second property is coupling, which refers to slack or buffer in cause-and-effect relationships. Tight couplings do not contain slack or buffer, but refer to direct causality since whatever happens directly affects what happens elsewhere. Loose couplings can best be characterised by ambiguity and flexibility in which the absence of intended connections can remain unobserved. Whereas loose couplings make it possible to display own logic and interest in terms of causality, tight coupling restricts such attitudes. Unlike loose couplings that are more stable as they can accommodate shocks without destabilisation, tight couplings generally respond to a quicker and more disastrous fashion to perturbations.[377]

In terms of the properties the following can be stated. Linear interactions indicate spatial segregation and dedicated connections. They refer to attributes such as easy substitution with only a few feedback loops. They also allow for single purposed and segregated control, since they rest on direct information that makes an extensive understanding possible. Complex interactions are based on proximity and common mode connections. They display interconnectedness and stand for limited substitution and many feedback loops. They require multiple and interacting controls that stand for indirect information and limited understanding.

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[375] PERROW 1984
[376] Ibid.
[377] Ibid.

Tight couplings do not make delays possible. Due to the underlying invariance of sequences, there is only a small amount of slack. Should buffers and redundancies exist, they are mostly built-in features that allow only for limited substitution. Tight couplings mean that there is hardly any spatial and temporal separation between a cause and an effect. Loose couplings allow for delays as the order of sequences is changeable. This results in extended and often unanticipated sets of alternative methods, slack and buffers in which substitutions are fortuitously available. In case of loose couplings causes and effects are separated both in time and space.[378] Linear interactions refer to highly structured, logical, sequential and predictable cause-and-effect relationships. In contrast, complex interactions offer less predictability due to the presence of unplanned and unforeseen relationships in terms of causality. Tight couplings can be described by high centralisation and rigidity, which allow for a close monitoring and a certain tolerance. Loose couplings mean decentralised operations and allow for a wide variety of outcomes in terms of effects.[379]

7.2. Differentiating Areas

The generic relationship between couplings and interactions allow for four possibilities that can be visualised and projected to the framework introduced earlier in this book. Joint operations can roughly be subdivided into four vague, but interrelated areas such as simple, complicated, complex and chaotic.[380] In general, the more one moves from the first area to the last from tightly linear to tightly complex, the more the level of predictability based on causal relationships decreases. In case of the latter it can disappear entirely. Figure 12 also shows that even if it is possible to discern causality in terms of physical effects such as one bomb/one kill, it is mostly impossible to see which way this particular effect relates to subsequent and desired psychological effects. The increase in non-linearity and the growing instability of combinations that goes with it result in difficult-to-decode relationships. Nevertheless, it is possible to explain certain characteristics of the combinations. Area I is called *simple* and can be described as tightly linear that stands for linear causality indicating known causes and effects. It is possible to discern clear and visible cause-and-effect relationships that allow for predictions. Due to their empirical nature causal relationships are not open to dispute and planning for effects makes sense. Consequently, this area can be characterised by the predominance of centralised causes and centralised effects. Area II bears the name *complicated* and can be described as loosely linear. It refers to knowable causes and effects. Causal relationships exist, but due to spatial and temporal separations they might not become fully known. Here the relationship between causes and effects are generally difficult to comprehend that indicates limitations in terms of prediction. Planning for effects still makes sense, but it must be taken into account that centralised causes increasingly yield decentralised and unexpected effects.[381]

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[378] Ibid.

[379] Czerwinski 1998; Perrow 1984

[380] Jobbagy 2005

[381] Kurtz–Snowden 2003; Snowden–Stanbridge 2004
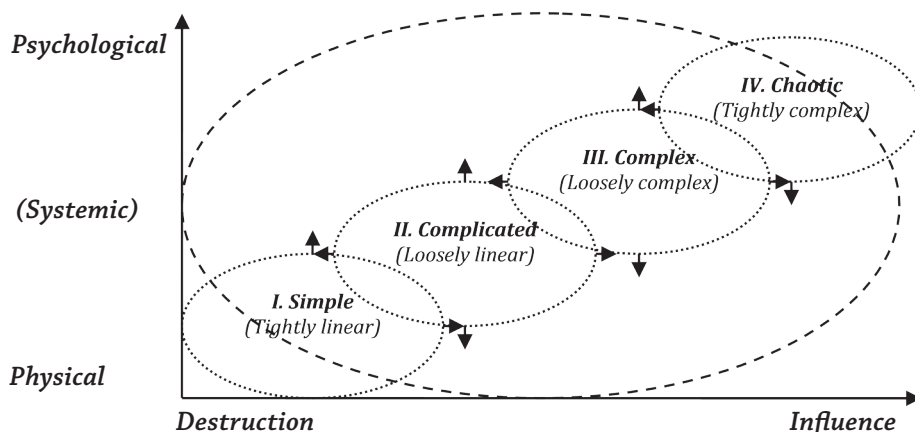
Figure 12.
Four areas projected

Area III is named *complex* and can be described as loosely complex. Cause-and-effect relationships might still exist, but they defy most attempts at categorisation or other analytical techniques. Effects can be perceived, but not predicted since their relationship is not open to any inspection. Both interactions and couplings indicate that causes and effects are mostly decentralised and appear coherent only retrospectively, but are even then subject to debate. Area IV stands for *chaotic* and can be described as tightly complex. Here there are no visible cause-and-effect relationships. This indicates that causality is basically not perceivable. The amount of factors together with spatial and temporal separations makes prediction impossible or allows only for very general terms to formulate. In this area it is not possible to plan for effects or discern causal relationships in a meaningful way.[382] The combinations of the properties made it possible to dissect joint operations into four interrelated areas with distinct characteristics. Whereas in tightly linear systems everyone can detect causality, in loosely linear systems experts might detect causality. In loosely complex systems causality often becomes clear only retrospectively. In tightly complex systems there is no discernible causality that can guide our actions.[383]

7.3. Complex Attributes

The more one moves towards the tightly complex attributes the more unpredictability takes hold. Earlier the concept of effects-based operations was located in the upper right area of the continuum of war as depicted in Figure 13. Unfortunately, this is the very area

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[382] KURTZ–SNOWDEN 2003; SNOWDEN–STANBRIDGE 2004
[383] KURTZ–SNOWDEN 2003

in which it is very difficult or impossible to detect and exploit causality. Another problem with any assumption regarding causality comes from the fact that even those areas in which it is possible to discern causality interact with areas that are inherently unpredictable. Consequently, as indicated earlier by friction, one must expect novelty everywhere and every time in joint operations. This also means that the Clausewitzian assumption that in war everything is simple, but even the simplest thing can become difficult takes hold.[384] Unpredictability stands for the fact that if one has no firm basis for comprehending the initial state with all the factors that must be considered, no one will equally have a basis to judge which of the possibilities should be regarded as desired effects. One can say that if any assumption on causality worked in joint operations, it would offer considerable promise only for physical effects, but in case of psychological effects the concept is rather hopeless. Unfortunately, this is the area in which most protagonists of effects-based operations and military coercion claimed to offer most benefits. It appears that in case of systemic effects the concept touches the borderline that separates prediction from pure guesswork. Causal assumptions are generally good for creating desired physical effects, and might occasionally be good for generating desired systemic effects. However, in case of psychological effects the best one can say is that the concept does not work well, but on occasion one might get useful information.[385]
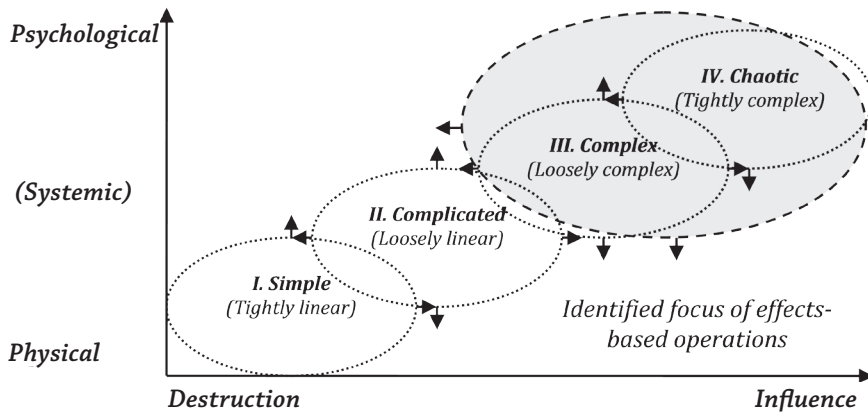

Figure 13.
Effects-based operations and unpredictability

The consequences of such a visualisation are serious since the figure indicates that the concept aims at exploiting causal relationships in an area in which it is either very difficult or even impossible to detect any sort of causality. The figure also explains why it was so difficult to find a useful coercive mechanism that aims at influencing behaviour rather than destroying physical capability.

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[384] Clausewitz 1993
[385] Lorenz 1993

Conclusion

In the book the author analysed causality in joint operations. In this attempt he used a recent and very fashionable concept called effects-based operations that drove both the employment and transformation of Western armed forces a couple of years ago. To better understand friction and how causality unfolds in joint operations he used *On War,* Clausewitz's epic work as a background. The chapters made it clear that most proponents of effects-based operations and military coercion approached war and joint operations as a management activity with a clear cut beginning and a definite end. The Western preference for causal constructs expressed in various force employment concepts and NATO doctrinal publications promotes concepts that rest on scientific assumptions. They are based on analysis and prediction with which it is believed that destroying or influencing assumed centres of gravity or critical nods/ elements can yield cheap victories. There is a clear and distinguishable relationship between 20th century force employment theories and effects-based operations. More specifically, according to the three common elements such as the emphasis on causality, technological focus and systems thinking, the concept belongs to the class of air force theories.

At the beginning of the last century, the assumed technological superiority of air power to achieve strategic effects on their own motivated military thinkers to search for mechanisms that allow victory without the involvement of irrational costs and losses. In the end and at least in theory, air power offered a promising solution to protracted surface-oriented attrition and annihilation warfare. These basic assumptions have never been really validated in the wars of the 20th century. Most theorists have felt rather than known what air power can achieve. Air force theories were originally fed by the false hope that war can be taken away from the battlefield. However, the airplane established only an additional area in this third dimension fought with equal ferocity. Air power's maturity and independence was regarded for many years as the driving force in strategic thinking; in the end it was on the battlefield where air power ascended to equality with the other services. Any sober theory of war and joint operations must take into account that waging war is an act that has always been more than linking ends with means in a simple deductive fashion and detecting obvious causality at the strategic level in the form of desired or decisive effects. Causal assumptions stand for deductive reductionism and laws attempting to predict certain desired effects. The supporting assumption is that war and joint operations display order and equilibrium. They stand for rational choices and the ability to steer and control events. In contrast, war and joint operations stand for variety and novelty in which despite best efforts to have a full comprehension, certain properties remain impenetrable to the human mind. War is fought on a spatial and temporal continuum involving both the material and non-material domains. It is as much a physical as a psychological phenomenon that span over many layers. War can be described in general terms using causal relationships, but effects that go beyond the immediate spatial and temporal levels cannot be predicted with any accuracy. Understanding war this way indicates that it is possible to only predict some things especially those that are local to us

both in space and time. Clausewitz suggested that everything in war is interrelated and all one can attain is nothing more than a temporary and partial interpretation.

It appears that humans tend to confuse causation with correlation and simulation with prediction. The former refers to the preference for creating retrospective validation to identify best practices. The latter points to the fact that even if one can simulate something, it does not obviously mean that it is equally possible to predict its future. War and joint operations display unpredictability in two ways. First in terms of what one is trying to achieve (effect), and second how it becomes possible to achieve what one wants to achieve (cause). Thus war stands for a general unpredictability in terms of ends and means. Several different futures are possible and there is not always time for mechanical, deductive systemic analyses aimed at detecting causality. Probably the most important consequence of such an approach is that instead of focusing on certain desired effects one should rely on the ability to respond consistently to the unpredictable nature of war. For Clausewitz it was clear that war cannot be waged based on single and prescriptive models. In a similar fashion joint operations require the capability to evolve rapidly in order to handle dynamic and changing situations. One must be satisfied with understanding certain general features in terms of correlation rather than attempting to discover a mechanism that links causes with effects directly. The campaigns in Afghanistan and Iraq showed that relationships between ends and means might be clear at the strategic level, then they become considerably less clear as specificities emerge, and more ambiguous as the full range of military options expands. Most assumptions of causality in effects-based operations and military coercion have no sound foundation and can be applied only with limitations. The GWOT aimed at fighting shadowy enemy organisations is the best example of an increasing difficulty to directly link military means with political ends and tactical actions with strategic objectives in order to identify, penetrate into and destroy the very centres within enemy organisations. Coalition forces in Iraq and Afghanistan experienced difficulty as they tried to circumvent the slow and painful processes of attrition and annihilation with the aim to achieve quick and decisive victory in the psychological domain to influence enemy thinking and behaviour. Various commitments of the West since the 1990s have shown how difficult it is to save precious resources in terms of time, money and manpower by collapsing enemies' systems that exist outside the traditional boundaries of a nation-state from the inside-out. Information superiority and technological sophistication are at the very heart of Western military thinking. However, they can best be seen as enablers, but not as ultimate leverage. War is full with emerging opportunities that can only help explain qualitative behaviour, but never accurately predict futures in terms of desired effects.

In the book the author also demonstrated that concepts based on deduction, analytical rationality and systemic thinking have clear limitations for war. The focus on ends/means rationality does not encompass the Clausewitzian image of war, sufficiently emphasising a frictional reality. The author demonstrated that although war might display direct causality, assumptions that rest on equilibrium and a constant environment make up only a small fraction of war's bewildering nature. Any uncritical attempt aimed at detecting direct causality expressed in the form of desired effects is scarcely more than a fallacy. At first glance concepts that stand for the exploitation of causality in war and joint operations appear to be weighty both in scope and insight as they draw on a diverse array of scientific ideas in order to generate hypotheses about success in war. This eclecticism is admirable,

but it often indicates inconsistency and a vocabulary that has no sound foundation. Despite claims that much of war can be addressed by deductive thinking, it is very difficult to deliver arguments for explaining why certain factors should be regarded as more important than others. Even deductive thinking and analytical rationality do not make possible to distinguish sufficiently among various alternatives and cannot satisfyingly explain the preference for certain selected factors.

The result is that many publications on effects-based operations and military coercion read like an accumulation of disparate and scattered statements lacking a true theoretical basis in which the central argument is nothing more than simple and uncritical descriptions of positive findings. Rigidity and blind adherence to predefined objectives can result in mounting costs both in terms of money and men. An exclusive focus on the strategic level only narrows exploitable tactical options. Consequently, one can easily become imprisoned in false hopes chasing desired effects. It appears that the Western world cannot see and address international security problems other than in quantitative and technological terms. Traditional attributes of war such as uncertainty, risk and ambiguity increasingly disappear from the vocabulary or are buried under empty concepts. This ignorance and the resulting mechanistic approach to war and joint operations explain why force employment concepts promoting causality/deduction, intangibles/control, and categorisation/analysis can become an important point of focus. They represent dangerous simplifications of war and the only logical outcome can be nothing else than a panacea that promises quick, easy and cheap victories. In this book the author addressed issues related to interoperability, multinationality and jointness. These are important factors when it comes to the military/civilian/police interface. Finding means to increase the efficiency of various institutions of a state in international missions is of utmost importance against an increasing number of asymmetric challengers. They are a threat to the existing status-quo and enjoy an abundance of opportunities in a globalised world. Interactions with such challengers very often result in asymmetric confrontations, including asymmetric warfare. When it comes to the psychological aspect in the form of psychological effects interoperability, multinationality and jointness require the military and non-military components to work together in a seamless way. This must be based on clearly understood and implemented doctrines, and a sound understanding of how cause-and-effect relationships work in joint operations. Only this way is it possible to explain the principles that underpin the planning and conduct of campaigns and major operations. The author's aim was to turn all this into a format that makes the characteristics of cause-and-effect relationships in joint operations better digestible for both military and non-military readers. He expanded on those aspects that require either interagency cooperation from a specific point of view or extra attention due to certain special characteristics. In this effort the author related joint doctrines to various social and other sciences.

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About the Author

Col. Zoltán Jobbágy started his career as an infantry officer of the Hungarian Defence Forces. He has served in various command and staff positions both in Hungary and abroad, worked as researcher abroad, and had the opportunity to serve twice as military assistant to high ranking political and military persons. Apart from obvious involvements into military tactical and operational matters his experience also includes human resource/personnel management, international relations and security policy, and operations research and analysis.

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Dialóg Campus is the publisher of the National University of Public Service.

This book is a treatise about causality in joint operations. Its content accords with that of official publications issued by the Alliance. Various NATO documents reveal that the way the Alliance approaches joint operations is in sharp contrast with the proverbial statement that war features friction that frustrates action and makes the simple difficult, the difficult seemingly impossible. The frictional nature of war does not allow effects to be traced back to single causes as several concurrent causes are normally at work.

Thus the book can be seen as a descriptive, reflective and explanatory study. It is descriptive since it describes the way causality decomposes in war. It is reflective since by discussing causality in war, On War serves as a basis. It is explanatory since problems are discovered, contributory factors are identified and explained in detail. At the heart of it is the recognition that theories capitalising on causal constructs may run the risk of being costly, slow and unnecessarily destructive. The aim of the author is to develop a novel and coherent framework to better understand cause-and-effects relationships in war.

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